engineering & services

Air Force
Engineering and Services
Quarterly

AFRP 85-1 VOL 22 NO 1 FEBRUARY 1981

EXCELLENCE IN GETTING THE JOB DONE AT BASE LEVEL

From the Director

Back to Basics at Base Level

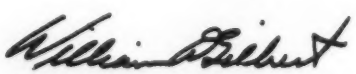
In this first issue of 1981, it is time to pause and acknowledge the progress we've achieved in our first year of the new decade. In 1980, the messages "From the Director" addressed the formidable challenges that Engineering and Services **people** must meet and overcome, "Decade of Challenge — Taking on the 1980's," "Super Projects of the 80s," "Readiness Revisited," "Greater Ingenuity and Cooperation (Satisfying the Demands for Energy with Concern for the Environment)." We have made good progress toward meeting those challenges — 1980 was a good year!

In 1980 our people were very competitive for promotion; the selection rates to major, lieutenant colonel and colonel have been very satisfying to me. Many have not yet been selected, but the opportunity is there in future boards for those who continue to shoulder the heavy loads. On the enlisted side, I'm pleased with the quality of senior noncommissioned officers that I have seen providing essential leadership at base level.

Now in 1981, we need to return to basics, and employ those key ingredients that give "Excellence in Getting the Job Done at Base Level." Prime BEEF and Prime RIBS training will take more time away from routine daily operations. Productivity may be slow to improve because we must train a large number of new accessions, directed duty assignees and cross trainees in the work force. Resource management will be even more critical as the nation works to reduce inflation and conserve energy. **The key to meeting all those challenges rests with you — the people.**

At a recent Air Force Association symposium in Los Angeles, General Allen, USAF Chief of Staff, stated "The single most important element of Air Force capability is experienced, dedicated, quality **people**." At the December 1980 Engineering and Services Conference, **the key presentation focused on people —** the need to reduce personnel turbulence, balance the entire military and civilian work force, and optimize the career opportunities for all within Engineering and Services. We've made great progress in defining the path toward improved personnel stability. Now I ask you to work together within our sphere of influence and responsibilities to:

- Recruit innovative, imaginative military and civilian people to fill our vacancies.
- Train our people to know their job for peace **and** war.
- Motivate our people toward mission, country, professionalism.
- Retain the people we need for our mission. Teamwork has been our hallmark of past successes. Together, let us make teamwork the symbol for the future.



WILLIAM D. GILBERT
Major General, USAF
Director of Engineering and Services

This issue is dedicated to "the troops in the front lines," those hardworking engineering and services people **getting the job done at base level.**

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DISTRIBUTION: F. The QUARTERLY'S annual subscription rates are $6.00 domestic; $7.50 foreign; $1.50 per copy. Mail check or money order to Superintendent of Documents, Government Printing Office, Washington DC 20402. Reader per copy ratio: 5 to 1.

The **Air Force Engineering & Services Quarterly** is an official non-directive Headquarters US Air Force publication, published quarterly under provisions of Chapter 12, AFR 5-1. Its purpose is to provide Air Force Civil Engineering and Services personnel with a timely and comprehensive picture of the importance, wide ranging involvement and direct relationship of civil engineering and services activities to successful accomplishment of the Air Force mission. It provides current information about significant civil engineering and services programs and accomplishments throughout the Air Force; pertinent developments in science engineering and management; and educational/training opportunities for enhancing professional thought and development. The **Quarterly** is edited and published by HQ Air Force Engineering and Services Center, Tyndall AFB, Florida. Contributions, suggestions and criticism are welcome. Opinions expressed do not necessarily reflect the official viewpoint of the Department of the Air Force, the Director of Engineering and Services or the editorial staff. Authority to publish this periodical automatically expires on January 1982 unless its continuance is authorized by the approving authority prior to that date. The use of a name of any specific commercial product, commodity or service in this publication does not imply endorsement by the Air Force.

THE CONCERNS OF OUR PEOPLE

by Maj Gen William D. Gilbert

The concerns of our people are important! People get the engineering and services job done. Their concerns affect how well the job is done. During rap sessions among the Air Force civil engineering and services management evaluation team (CESMET) and more than 150 officers and 600 senior NCOs, many valid concerns were expressed. The purpose of this article is to spotlight eight of the principal concerns and reduce the issues to their basic elements. In this way we can focus our efforts on achieving real solutions to real problems. Some concerns affect only officers, some affect engineers and some mainly NCOs, but the concerns should be understood by all and answered satisfactorily. The bottom line is to eliminate the concerns within the constraints of readiness, public law and available resources.

Readiness

• *Many officers and senior NCOs are concerned that Prime BEEF and Prime RIBS teams need additional equipment and training for the wartime mission.*

Readiness is the principal task of our blue suit force, and I am pleased that many of you are not satisfied with the status of our preparations. Neither am I! For example, training on rapid runway repair in a chemical environment and equipping our contingency forces with suitable protective clothing are just two instances where we are seeking improvements. In the competition for resources, I fully support readiness initiatives. We have increased the capacity of the Eglin readiness training center. More teams may now undergo realistic deployment training. The Readiness Group at the Air Force Engineering and Services Center (AFESC) should have a home-station training guide for your use later this year. But, on the negative side, we have found too many bases that had not included equipment requirements in the base budget nor had commanders been asked to approve additional readiness training. On the positive side, several bases hold combined Prime BEEF/RIBS local field training sessions and at the same time accomplish some needed base projects. Imagination in managing base recovery forces has produced enthusiasm and very realistic training at some bases. We need realistic training with fully equipped teams at all locations.

Manning and Productivity

• *Engineering and services authorizations have been reduced without corresponding drops in workload and skilled civilian journeymen have been replaced by military apprentices and the manpower standards fail to consider the increased workload at older bases. All these factors reduce productivity without any corresponding drop in the workload.*

Engineering and services, as well as the overall Air Force authorizations have decreased since the early 1970s, due largely to the phase-down in Southeast Asia. Realistically, I do not see us returning to this authorization level in the near future; the competition for resources is just too keen. Manpower standards are an "averaging technique" that determine Air Force-wide requirements. A letter was recently forwarded to the field that outlined

flexibility in the manpower standards process to accommodate situations such as old facilities, at a particular location.

Integrated planning to foresee and rectify the sometimes divergent manpower and personnel actions affecting the military and civilian workforce has not been sufficient. Arbitrary civilian reductions in force, military grade reductions, indiscriminate contracting of functions and conversions under the critical military skills program have all impacted on the personnel resources needed to get the job done. The warning signals became quite clear last spring, and in March, I directed AFESC to study the combined effects of these competing programs on our base level resources. One initial finding is that the military and civilian supervisory mix is out of balance. I am determined to restore the balance. In so doing, I believe we will solve a long-standing problem and complaint by providing more real supervisory positions for our NCOs at continental United States (CONUS) bases. That will be a major step in overcoming a most frequent and valid complaint by our NCOs.

In addition, we are attempting to develop wartime manning standards that will help define the hard core military manpower requirements. Associated with this effort is the civilian indirect combat support recovery force study which will help give us a total look at wartime requirements. Not only will the civilian study compare peacetime manning against CONUS wartime needs, but it will also provide some protection for vital civilian wartime positions against peacetime reduction actions.

The indications are that these studies may reflect a manning shortfall. We need better ways of accomplishing the job and training our people. Ideas that enhance productivity are a prime way of handling the workload. As an example, the CESMET recently observed one base that increased the paint shop output by nearly 20 times. The base used a heavy duty airless paint sprayer and an operator-controlled hydraulic platform. Another base developed a plan to significantly reduce the workforce in military family housing maintenance without sacrificing service to the customer. Similar productivity enhancement ideas are needed in other areas. Although I support valid requirements, I can't promise increased authorizations. I can support and heartily indorse any productivity enhancement initiatives that you develop.

Poor Internal Communications

• *Communications between officers, NCOs, airmen, civilians, commanders, supervisors, and workers may be blocked. People don't talk to each other; supervisors don't listen to their people.*

I believe every unit can be a good one, and all of our people want to do a good job. The best organizations have strong internal communication networks in which an individual's ideas or concerns get full consideration and a timely response. During base visits I listen and respond to our people. I ask each base civil engineer, chief of services and supervisor to listen and respond to their people. You must take the lead and create regular opportunities to meet with them on an informal basis. Listen to their concerns, discuss ways to do the job better and improve productivity.

Crisis Management.

• *Crisis management techniques are used excessively in accomplishing commanders' high interest work. Too many high interest jobs cause nonproductive disruptions in the workforce by starting work that is unplanned or materially incomplete.*

This is a perception that we need to put to rest. A tradeoff exists between lost productivity and responsiveness. We make such tradeoffs easily for what we perceive to be legitimate reasons. Yet for some reason a few choose to challenge a commander's interest item. Support of the commander is important; providing timely support is an indicator of responsiveness. Committing a relatively small portion of total available resources to provide quick response in meeting unforeseen requirements may well lead to increased resource support to meet other needs.

A commander normally uses only one to two percent of the total available manhours. The CESMET has visited bases well organized to manage the "crises." High interest projects were smoothly integrated into the schedule and the workers maintained full productivity while earning accolades for their accomplishments.

Incentive Pay for Engineers

• *Starting salaries for engineers with no experience average about $22,000 per year. The Air Force does not have a bonus or incentive pay to compete for these engineers in the job marketplace. Should the engineers be a separate corps?*

I supported an initiative to create an incentive pay for engineers in the 1981 budget. The proposal was supported through several levels of Air Force review but did not survive the final competition for the very limited dollars in the Department of Defense budget. I will continue to support this pay until it is approved.

On the other hand, I believe it is important for the engineers to be "line of the Air Force." We need to be responsive to Air Force mission requirements. Under combat conditions, the engineer needs to be at the right hand of the commander, helping to maximize aircraft sortie generation or missile launch capability.

Until the pay gap is closed, we need to highlight the advantages the Air Force offers. These include opportunities to take full responsibility for projects, room for leadership growth in changing environments, a wide variety of interesting jobs, and educational benefits such as short courses and graduate school. All lead to job enrichment and job satisfaction. The Air Force offers young engineers a stimulating opportunity to invest their potential in the rewarding calling of service to their country.

Professional Registration

• *Does the Air Force really want registered professional engineers? How is registration used in the Air Force?*

Professional registration as an engineer or architect is an important measurement of the quality of the force. Those who meet the engineering or architectural registration challenge are infinitely more valuable to the Air Force. But registration alone does not make an officer outstanding. Performance is still the prime indicator. There are personnel who have provided outstanding service to the Air Force and do not meet the prerequisites for full registration. I support professional registration. Indicative of that support is the recent establishment of an architect intern program that meets the requirements of the American Institute of Architects. My policies also encourage registration. From a pragmatic point of view registration should be the goal of every engineer and architect — the inherent final step in attainment of professional status.

Registration by itself does not necessarily make you more competitive within the line of the Air Force. Completing professional military education (PME) does represent passing a quality level within the line of the Air Force. I expect our officers to actively pursue PME in addition to professional registration.

In the same vein, completion of the requirements for an advanced degree represents another quality level within the line of the Air Force. Our officers should also seek advanced education to be competitive. Once PME and advanced degree requirements are met, then completing professional registration becomes an asset in the competition within the line of the Air Force. The supervisor should recognize professional registration in the officer effectiveness report.

Finally, I use registration as a factor in selection of individuals for key positions.

Advanced Degrees

• *Limited opportunity for graduate school is causing a number of officers to leave the Air Force at the four-year point.*

An educated engineering and services officer force is needed to handle the challenges of the next decade. I fully support education, but I do not agree that limited opportunity exists. At the Air Force Institute of Technology Civil Engineering School, we have a program to give continuing education credit for some of the short courses. We encourage those officers whose undergraduate grade point average does not meet present academic standards for an engineering graduate degree to retake selected undergraduate courses and raise their average to acceptable standards. Opportunities do exist for each engineer and services officer to achieve a graduate degree. Certainly most of our officers should be able to get a graduate degree, maybe not in the year in which they first apply, but subsequent applications should sooner or later produce results.

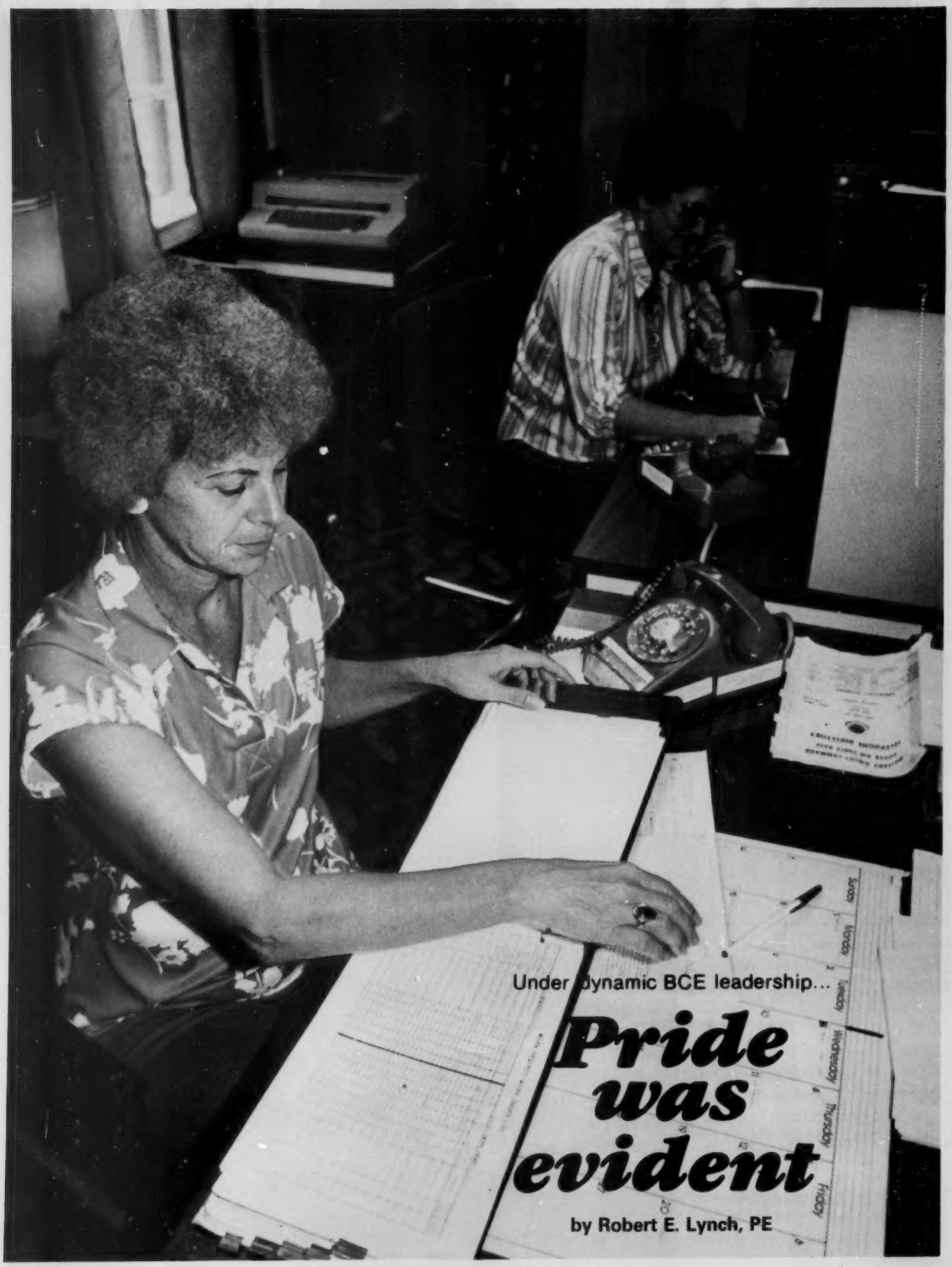
Impersonal Personnel Management

• *Young officers and enlisted members of the Air Force want to steer their future and do not want to move often or move overseas. Remote assignments have become more difficult to fill. As the buying power of the dollar has dropped, assignment to Germany or England is no longer perceived as a "good deal." Younger members see the Air Force making arbitrary decisions about their future.*

Air Force personnel policy is to provide equality in assignment consideration consistent with the overall needs of the Air Force. The present system, although not perfect, does try to match personal desires with Air Force needs. But, some personnel will go overseas, some will go remote, and some will move at the less desirable times of the year. I believe we need to be mature in recognizing when it is our turn to share the less desirable locations. Let me say a few words about arbitrary assignments. In 1980, the CESMET followed up on several alleged arbitrary officer personnel actions with the Palace Blueprint staff at the Air Force Manpower and Personnel Center. In each instance, we found that Palace Blueprint had tried to accommodate the individual's desires. Therein lies the key to more personal attention. Call Palace Blueprint and let them know your desires.

I also expect each base civil engineer and chief of services to listen to their people's assignment needs and take action through the proper channels. You must see that our people receive fair and considerate treatment. By working together, personnel management can be a little more personal for our engineering and services family.

My responses to some of the major concerns expressed during the many visits of the CESMET are an attempt to address these concerns in an open forum and improve communication. We need a close-knit organization to resolve the concerns and mutually make the Air Force a better place for us all. Good communication is a proper place to start. I also pass the torch to you to improve communication within your unit, your base peer group and your local community. I welcome any comments you may have regarding these and other concerns. We can all take a part in supporting the Air Force mission to the best of our abilities. In this way we can continue our "Excellence in Getting the Job Done at Base Level."



Under dynamic BCE leadership...

Pride was evident

by Robert E. Lynch, PE

The HQ USAF Civil Engineering and Services Management Team (CESMET) report on its March 1980 visit to Dover AFB included the following comments: "Under the dynamic leadership of the base civil engineer (BCE), Colonel Dick Scrafford, the civil engineering organization has been very responsive and successful in providing strong support of the strategic airlift mission. Good ideas and involved management characterize top management of this fine squadron. We met many fine people with good attitudes, — *Pride was Evident!*"

The lion's share of the credit for the success of this "fine squadron" must go to its leader. During his tenure as base civil engineer, management evaluation inspections (MEI) ratings have improved from satisfactory to excellent to outstanding. The 1975 USAF CESMET gave him a good report; the 1980 CESMET gave him an outstanding one. But if you ask him why his organization is outstanding, the normally articulate BCE seems to be at a loss for words. Finally, he says, "We do about the same thing everyone else does; we have good people." What the colonel could say, but doesn't, is that he provided the personal leadership to mold these people into a team with the attitude that "We are good, but we can always do better!"

If BCE management was described by one of the management textbook terms, "participative management" would be most accurate. Management is most definitely goal-oriented as evidenced by the management by objectives (MBO) program and strong emphasis on the in-service work plan (IWP) and real property maintenance by contract (RPMC) programs. Management is also people-oriented, as shown by emphasis on career development and by the open flow of communication throughout the organization. The BCE spends approximately twenty percent of his time in scheduled internal civil engineering meetings. These meetings serve many purposes: (1) to keep the BCE informed of happenings within the organization; (2) to provide a forum for the BCE to establish policy and give direction where needed; and, (3) to stimulate upward flow of communications from subordinates to top management.

Most of the senior managers have several years of experience. Colonel Scrafford has been the BCE for over six years. The deputy BCE and all branch chiefs, except operations and industrial engineering, have more than four years experience in their jobs. But this management team has never been accused of being resistant to change. Management is continually looking for fresh ideas that can lead to improved performance. Some of the changes made in recent years include development of an MBO program that works, establishment of a word processing center, several facility and organizational changes (some that worked and some that didn't), and implementation of a career management program for engineers. New ideas, at least in the discussion stage, are more organizational and facility changes, and improved use of the computer.

One of the more successful tools has been the MBO program. The MBO committee meets in a quasi-social setting in a conference room at the officers' club after duty hours. The committee includes senior managers and officers, and is used to establish operating philosophies, policies and goals. The program provides valuable training, especially for junior officers. Because of the setting all attendees can propose approaches and ideas in a non-threatening environment. Discussions are free-wheeling and often produce ideas, directions, and solutions that probably would not surface in the office. Part of each meeting is devoted to checking progress against long range goals. Some recent concerns for which objectives have been established are supplies and supply funds management, implementation of a new contractor operated civil engineering supply store (COCESS) contract, improving the use of the base engineer automated management system (BEAMS), energy

RIGHT, Colonel Scrafford meets with members of the industrial engineering branch. He spends much of his time in informal BCE meetings.

conservation, quality maintenance, career management, BCE physical plant improvements, responsiveness, and contingency planning.

Word processing began with mag card typewriters in engineering. This section has advanced to a centralized word processing center in unit administration with five mag card typewriters and centralized dictating equipment. Further equipment upgrade to cathode ray tube and floppy disk is planned. Before centralized word processing, typing of specifications was a limiting factor for year-end procurement. Design capability and funds are now the limiting factors.

A career management program for engineers, both military and civilian, was recently implemented. An informal program to rotate junior officers among the various authorized positions has been in effect for some time. This program has been formalized, expanded to include civilians, and provides for some training assignments to positions not on the unit manning document (e.g., assistant chief of resources and requirements). A follow-on aspect will be job swaps between senior design engineers and middle managers of the same grade. The ultimate goal of this program is to provide a broad selection of highly qualified candidates for future management vacancies.

No one ever won an argument with the BCE by telling him that the computer was wrong. His answer always is, "The computer is right; if the data is wrong, you'd better fix it." This involvement at the top builds interest within the organization in the accuracy of BEAMS data. A number of our people have become very proficient in writing retrievals. Manually prepared reports have become virtually a thing of the past in certain areas, especially the RPMC program, as we have learned how to obtain data from the computer. The next phase of BEAMS expansion should be into the job order system. Innumerable man-hours are required just to cross-check records and periodically purge files with the manual system we now use.

In management of the organization, effective use of staff members and the delegation of authority to accomplish tasks are supremely important. From a practical standpoint, if the BCE is consumed with operating every program, time for planning will not be available. Similarly, branch chiefs will not have opportunities to exercise their talents. Delegating authority builds initiative and morale, and provides subordinates with the training and experience to handle larger jobs. Top management insists that branch chiefs manage their branches, including signing most correspondence and verbally communicating with the command levels required in the conduct of branch activities. Accordingly, the branch chiefs have visibility. An illustration of the success of this policy would be the three operations branch chiefs who departed from Dover in the past four years. They all went to higher level jobs — one is a director in a major command, and the other two became BCEs at other bases.

BCE management believes in planning. Total programming brings back memories of a concept that deserved a better fate, but died under the weight of too much paper and too few facts. Total programming — the identification of requirements to allow for orderly programming — is still valid. The IWP, CECORS and manual plans such as the paint plan and paving plan still provide means for recording and ranking requirements. The annual RPMC program is based on customers' priorities, but recurring maintenance and repair projects are always included. The current month IWP is reviewed weekly at the BCE and commander's updates. In addition, the number of work orders in the system by status category is reviewed weekly to ensure that a uniform workflow

Carpenters alter reorganized facility.

exists (similar to the visible IWP concept).

If the 436th Civil Engineering Squadron had a motto, it could be "We Can Do Anything." The goal is credibility with the customers — meaning that the customers, from dormitory occupant to wing commander, believe that a commitment from civil engineering is backed up by performance. Credibility can be attained. It begins with the positive attitude of top management and requires leadership that promotes motivation and enthusiasm throughout the organization to build a quality work force. Most importantly, communications with customers must keep them informed of the status of their work, and obtain their assistance in setting priorities. All the work cannot be done now, but credibility can be gained if priority work comes first. For a new BCE, the first priority is to establish credibility with the base and wing commanders; ask the commanders to identify their highest priority projects, and then make sure these projects are completed properly. Credibility is gained by proving that you can perform.

In summary, the following concepts reflect some of our basic management philosophies:

- Look for perfection. Encourage it. Set your standards high, but don't be concerned with inconsequential details.
- The most important person on the base to the BCE is the base commander, but the base commander isn't paid to manage civil engineering, you are.
- You need new ideas. The best way two years ago may not be the best way today.
- Leadership is active, person-to-person communications.
- Hire good people and give them opportunities for development.
- Make the computer do the work. Ask your people to get it out of the computer if they give you hand written data.

- Read the directives (including CE, personnel, manpower and the union-management agreement) — it's hard to play the game if you don't know the rules.
- Keep the customer informed. Our objective is credibility with the customer.
- Management problems are not solved with work orders, only postponed.
- Delegate. It strengthens your management team.
- Get the customer involved in the setting of priorities.
- The total programming concept is valid.
- We can do anything given the resources, the time and good people with good attitudes.

Robert E. Lynch *is deputy base civil engineer at Dover AFB, Delaware. He has a bachelor of science degree in industrial engineering from North Carolina State University and a master of arts degree from Central Michigan University. He is a registered professional engineer in the State of Delaware and a member of the American Institute of Industrial Engineers.*

TOP RIGHT. SSgt Banez monitors base engineering automated management system (BEAMS).

RIGHT. Mr. Mike Adkins, a civil engineer, shows his skill in writing BEAMS retrievals.

Directorate of Engineering and Services

Current Emphasis

a brief commentary on significant developments

FACILITY ENERGY REDUCTION--During FY 80, the Air Force reduced its facility energy use per square foot by 13.3 percent compared to FY 75 levels. This is well ahead of a 20 percent energy reduction goal by 1985. The majority of this reduction was accomplished through the outstanding energy conservation efforts of all our people. Base level energy management actions are the most important part of our conservation program. (AFESC/DEB).

TRANSIENT QUARTERS UPGRADE PROGRAM--MAJCOM approval authority for expenditure of billeting funds to upgrade transient quarters recently has been raised from $100,000 to $300,000. This change should help to expedite project approvals in support of upgrading transient quarters to desired Air Force standards. (AFESC/DEHS).

CORROSION CONTROL PROGRAM--Estimated $300 million annual Air Force civil engineering corrosion loss pinpoints need for greater emphasis. Revision of AFR 91-27, Corrosion Control, and other publications, provide the necessary maintenance criteria to revitalize the program. AFR 91-27 and AFM 85-5 advance copies have been sent to MAJCOMs for familiarization and planning. Corrosion losses can be cut dramatically! (AFESC/DEMM).

CAREER FIELD RESTRUCTURING--During 1978 the Air Force Military Personnel Center was directed to find causes for grade imbalances (i.e., authorized vs assigned) that generated the need for retraining programs. Their study determined that the equal opportunity for promotion system generates imbalances when career field grade allocations are not structured similar to grade distribution desired by TOPCAP (total objective plan for career airmen personnel). "Career field restructuring" is an Air Force initiative to bring the authorized grade structure for each career field more in line with TOPCAP to preclude future significant grade imbalances. Restructuring will begin with the FY 81 grade allocations which will recommend grade distributions for career progression groups. HQ USAF/LEE has asked each MAJCOM/DE to analyze their command enlisted grade structure and identify imbalances. Included in this review is an evaluation of the military/civilian mix to determine changes needed for an equitable distribution of jobs at the foreman and superintendent levels. (AFESC/DEMG).

YOUTH CONSERVATION CORPS (YCC)--Twenty-one installations hosted YCC camps in 1980 with total funding from the Department of the Interior reaching $1.1 million. The picture looks good for 1981 and a formal announcement and request for proposed budgets will be announced to major commands in the near future. Begin planning now if you desire to host YCC. As in the past, camps will be of residential type only and approval will be based upon the Department of Interior's review of the proposed camp plan and budget. (AF/LEEV).

GRADUATE ENGINEERING MANAGEMENT--In June 1980, the Air Force Institute of Technology (AFIT) School of Systems and Logistics entered the first class of students into the new graduate engineering management program. This fully-accredited, 15-month, in-residence program provides qualified civil engineering military and civilian personnel with a technically oriented management degree. Further information can be obtained by contacting AFIT/LSM, AUTOVON 785-5023. (AFIT/LSM).

AGMC is understandably proud of the descriptive metaphor it has earned ... GOLD WATCH of the command.

by Don E. Hunt and Maj James W. Goodman

General Bryce Poe II, commander of the Air Force Logistics Command, (AFLC) refers to the Aerospace Guidance and Metrology Center (AGMC) located at Newark, Ohio, as the "Gold Watch" of his command. We at AGMC are understandably proud of General Poe's descriptive metaphor — we have worked hard to earn it.

This article describes the energy program and the recurring maintenance program at AGMC. These programs and their results may be thought of as the polish that makes the Gold Watch shine.

On June 30, 1980, the Aerospace Guidance and Metrology Center was presented the pretigious General Edwin W. Rawlings Energy Conservation Award. This award, presented for the first time at the June 30 ceremony, is an annual award for the person, function, or unit within AFLC which has demonstrated outstanding accomplishments in support of the nation's energy goals.

The award was presented to AGMC in recognition of the success of its energy program in the 12-month period in 1979-1980 during which President Carter directed that facility energy consumption within the Federal government would be reduced by 5 percent. AGMC surpassed the President's goal by nearly 300 percent with a 19.6 percent reduction in its total facility energy consumption. General Poe stated that "AGMC's team response enabled the command, as a whole, to surpass the objective" with a 5.5 percent reduction.

To put the story behind the success of our efforts fully into context, a bit of information about AGMC is required. It is an energy-intensive industrial facility employing over 2,500 highly skilled technicians, engineers, and craftsmen.

We are responsible for the repair of most Air Force and some Army and Navy inertial equipment. Engineering support is provided for these systems and for other inertial equipment in the development stage. The term "inertial equipment" identifies the highly sophisticated systems and their components which form the heart of the modern guidance and navigation systems used in missiles, planes, ships, and submarines.

We also manage and direct the Air Force metrology and calibration program, including the Air Force measurement standards for all the precision measurement equipment laboratories for Air Force bases worldwide.

The work we do in our production areas requires extensive environmental control with very rigid specifications. We operate a large inventory of very sophisticated test equipment. We also maintain a large quantity of small, intricate parts which are highly susceptible to damage from handling and environmental changes.

Our energy program as it now exists had its origin in the President's February 1979 memorandum to reduce facility energy. We received direction in March 1979 to immediately reduce our facility energy consumption by 5 percent.

In light of the increasing emphasis being placed on the subject of energy at that time, both nationally and internationally, we expected any reduction in facility energy to be a continuing requirement. In other words, we were not going to solve this problem with a crash program to reduce consumption one month and then drift back to normal the next month.

We decided that if we were to achieve an immediate reduction of 5 percent from the previous 12-month consumption, and do it in such a way that we could make the reduction permanent, we needed a fresh, new energy program. Considerable thought went into the philosophical aspects of what this program was to accomplish. As a result of these efforts, five major program guidelines were developed.

We will in no way do anything in the name of energy conservation which will adversely affect the quantity or quality of our production.

We have to show net savings in dollars as a result of reducing energy consumption. We recognize budget impact as a major reason for energy conservation.

We must inspire work force confidence in the integrity of the energy program to earn their continuing support and cooperation.

We will not require action which will result in small energy savings and at the same time serve as work force irritants. For example, we do not unplug coffee pots and water coolers.

We will provide high level, single point management of our energy program to generate fast response and to assure coordination of organizational efforts toward one common goal — the reduction of energy consumption at AGMC.

We made a cardinal rule that the quantity and quality of our production must not be allowed to deteriorate as a result of our efforts to reduce energy consumption.

Interface console maintenance personnel were concerned that turning off the units would cause increased maintenance and impact production. They made carefully controlled tests in conjunction with the weekend shutdown program and found that the reliability of the consoles actually improved.

While this appears to be an obvious requirement, we found that frequent reference to it was (and still is to a lesser extent) necessary to allay the fears of management and other members of the work force that overzealous efforts to reduce energy consumption would impact their production quotas.

All of the electrical power used at AGMC goes through one meter located in our main substation; similarly all of the natural gas goes through one meter. Within our one large building we have literally scores of buildings which share environmental control systems and electrical distribution centers. These buildings, in turn, house a variety of organizations such as the directorate of maintenance, the directorate of metrology, and various 2803 Air Base Group organizations such as the civil engineer, supply, etc.

We decided that rather than impose energy goals on each of these organizations, we would address all of our efforts to one goal, that of AGMC. The logic in this is readily apparent. An organization would try to meet an imposed goal with limited means of verifying success and, also, such goals would by their very nature tend to dampen cooperation between organizations.

Finally, we knew if we were going to pull all of the organizations together and to get the rapid response needed within the program to make it happen and happen quickly, we needed a manager for the energy program who wasn't tied to any organization and who had the authority to "move mountains." This was done by creating an energy "czar" who reported directly to the commander.

The next step was to put all of the ideas into a program that would work. One thing was evident from the start — we were not going to get quick reductions by resorting to expensive, long-lead-time technology. If we were going to do it, we were going to have to rely on our common sense and work with what we had.

Our environmental control systems consume about 80 percent of the total energy with the rest being used for lighting, test equipment, generators, vacuum pumps, etc. We decided that we would concentrate on the environmental control systems. It was easy to find an area where savings could be obtained — we maintained continuous environmental control in every production area, seven days a week, but worked on weekends only when production requirements necessitated overtime.

While knowing where to save was easy, actually doing it wasn't. This is where the philosophy of our program, common sense, and determination paid off. We decided that we would turn off the environmental control systems on a test weekend. We set a date and went to work. Our engineers and production people identified what special precautions were required in each room of each production area to prevent damage to parts, fixtures, surfaces, and test equipment. Our

test equipment experts studied our equipment to identify what had to be left on because of stablization requirements after restart. Our facilities people made studies of our extensive support equipment such as 400 Hz generators, 28 VDC rectifiers, and vacuum pumps to determine what could be shut down and what had to remain on because of peculiar production equipment problems. This support equipment also had been running seven days a week. Our civil engineering people were involved throughout, studying their equipment and supporting the efforts of the other organizations in solving the problems they encountered.

Shutdown books were prepared for each production. Each book contained all the details and requirements pertinent to a shutdown in that area. The production area supervisor on the last shift of the work week was made responsibile for preparing his area for loss of environmental control.

An air handler shutdown schedule was prepared and fully coordinated. It had the required OFF and ON times for 57 air handlers clearly stated for the civil engineering personnel to follow in the actual shutdown. It also contained ON and OFF times for our five large central vacuum systems.

Elaborate data collecting efforts were undertaken in all production areas to collect data on what actually happened in each area from a temperature and humidity standpoint during the shutdown. We collected data on every cost involved in the shutdown from overtime cost to the cost of plastic bags used to bag parts. We even created cost accounting codes in our automated maintenance management system to track employee time used in preparing for and recovering from the shut down. We also had codes to account for lost production time attributed to the shutdown.

In short, a great effort was made to assure both management and the work force that we were serious and that we would accurately track costs and watch very carefully over our production efforts to insure that they were not affected.

That weekend was a success. We skipped a weekend to evaluate our efforts and have continued the program every weekend since. The program has been refined continuously until it now is much more efficient and nearly routine.

We have never had any lost production, and the energy savings to program cost ratio in dollars is over six to one. During the 12-month period after we started the program, we reduced our actual natural gas and electricity bills by $131,033.89 (11.4 percent) from the cost during the preceding 12 months. Had we not reduced our consumption but used as much energy as we did during the preceding 12 months, it would have cost us an additional $225,000 at later utility costs.

Our energy program has experienced continuous and improving cooperation between and within our organizations, generating the "teamwork" mentioned by General Poe. This cooperation can be traced, we think, to several facts. One is our commitment not to unplug coffee pots and water coolers or, in general, expend any extensive efforts on what our technically competent work force knows to be "nickel and dime stuff" insofar as energy savings in our facility are concerned. This encouraged our people to believe we were really serious about energy reduction and avoided the friction within the work force that such actions had generated in the past.

Extensive efforts were made to inform everyone, especially management, about the results we were obtaining. They saw we were actually saving large sums of money and were convinced that the savings were real, not just fancy pencil work. We also worked diligently to let everyone know there was no affect on production and that production was an ever present concern in the program. Whenever a suspected problem was identified we went to great lengths to thoroughly investigate it. In every case, so far, we have been able to completely vindicate the shutdown as the culprit. This has successfully prevented the development of undesirable and infectious rumors.

We believe the lack of individual goals for each of our organizations has also had a significant part to play in the level of cooperation experienced between organizations. We eliminated competition and stimulated cooperation.

When we first started the program we encountered considerable resistance throughout the work force; we proposed doing things that hadn't been done be-

Coffee pots are not unplugged as part of AGMC's energy program. Coffee pots are part of a category of actions viewed by AGMC as possessing low potential for energy savings but a high potential for becoming work force irritants.

fore, and we were deluged with dire predictions as to what would happen. Now the situation has turned around. We can propose an idea which radically departs from normal procedures and meet with a favorable and receptive attitude.

It is interesting to note that almost all of the savings we have realized have come from the elimination of waste in our energy consumption. The waste was eliminated by management attention to the way we do business, not through technological innovation. It was cheap and straightforward even though not easy.

What also is interesting is that we believe that through additional management attention to work processes and our special requirements, we can **create** energy waste which can then be eliminated to give us more cheap to acquire but very significant reductions. A couple of examples illustrate this concept.

Most of our production areas operate on a three-shift basis. If we can reduce the production operations to a two-shift basis, we can extend the shutdown program to include the unworked shift. This has the potential to yield savings of over 10 percent of our annual consumption. An added advantage of two-shift operation, would be to increase our wartime surge capability, by having the third shift to expand to. Changes of this type may involve some new test equipment in some cases and relocation of processes in others. In every instance extensive planning and determination are required. We intend to do it, maybe not in every production area, but in most.

In contending with significant maintenance responsibility, the recurring maintenance program (RMP) surfaces as a critical step in providing continuous service and has the full commitment of shop personnel. The RMP emphasizes systematic inspection, maintenance, and repair of our systems on a continuing basis. While the RMPs at a number of bases have been a target for criticism, we have found ours to be a primary vehicle to assist in reducing post-failure maintenance activities. An RMP completion rate at AGMC of 99.5 percent for 1980 reflects our confidence in the program. Moreover, mechanical equipment maintenance personnel evaluate the operation of a number of the major chillers on an hourly basis. This practice has further enabled the maintainers to resolve problems before production is affected.

The success of our energy program has given us reason to believe that in many instances advanced technology may be sought as a cure for energy problems too early in the game. It is probably correct to say that technology is often an "easy" way out. It would appear that energy waste should be eliminated first through management prerogatives. Then, and only then, can a fair and accurate appraisal be made of the advantages to be had from the use of applied technology to further reduce energy consumption.

To avoid a wrong impression, let us state at this point that we at AGMC are using advanced technology in our efforts to reduce consumption. For instance, we have replaced one of our old chillers with a new 400-ton unit which is more energy efficient than the old one. We have a project which in the near future will provide a means of recovering heat from the condenser water going to our cooling tower. We also have an energy monitoring and control system to help control our peak electrical demand through load shedding. This system is intended to eventually provide enthalpic control to make our environmental control system operate more efficiently.

Our most challenging energy project is Project POWER. POWER is an acronym taken from providing opportunity with energy resources. Project POWER has as its goal the independence of AGMC from outside oil, natural gas, and purchased electricity before the year 2000. State-of-the-art technology in the field of energy generation and alternate energy resources will be adapted to AGMC's needs to enable us to meet this goal.

In summary, we have concentrated our efforts at AGMC in reducing the energy waste associated with the way we do business. We have made the reductions with careful attention to personnel reactions to insure that our personnel are supportive of the program. Through growing awareness and increasing participation, the energy program will be able to maintain its momentum, even after the "easy to get" waste has been eliminated. Once we start to "bottom out" in our search for waste, we can search for technological means to make the remaining necessary uses of energy more efficient.

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At the USAF Academy housing supply married data automation .. the result

Excellent Customer Service

by Capt Randy D. Barker

Positive inventory control is essential to the success of any operation, and critical in control of furnishings handled by the base furnishings management (housing supply) organization. Maintaining clear, precise information about item location and condition can require a significant amount of time, detracting from service to the customer, or through the use of computer technology be an aid to excellent customer service.

Numerous inspector general and civil engineering and services management evaluation team (CESMET) reports call the furnishings management division at the U.S. Air Force Academy (USAFA) a model of efficiency in inventory management and excellence in customer service. This operation uses the computer to solve the complex problems created in handling a large (in excess of $1 million) family housing furnishings account, and easily can be adopted for use at other installations.

The academy inventory management system employs an AF Form 814, custody receipt card, for each item in the inventory. This card shows the stock number, nomenclature, quantity issued, and custodian code for each item. Cards for items in the warehouse are maintained in the warehouse file.

Issue of items and inventory control are accomplished on USAFA Form 0-265, furniture receipt. As authorized by Air Force regulation 140-1, the Form 0-265 can be substituted for the AF Form 228, since it shows all required data. This form serves both as the issue/receipt document and as the computer file header card for the quarters. A duplicate of this form is also made and given to the customer as his copy.

When a customer visits the furnishings management division office, items are selected from picture boards posted in the selection area. Each item pictured has the custodian code number posted on it for aid in retrieval of the proper inventory card. Once the item has been selected, the appropriate card is pulled from the warehouse file and entered on the furniture receipt. The physical item is then checked for condition and is issued to the customer. Once this process is completed, the customer initials for each item and signs the USAFA form 0-265. The header card and item cards are then filed in the master card filed under the appropriate quarters number.

When items are returned, the header card is annotated and initialed by the furnishings management division. The inventory card is pulled when the item is returned to the warehouse and placed back in the warehouse file. When items are to be sent to salvage, the appropriate card is pulled and held in the salvage file until the AF Form 601 b is approved and the item turned in.

The cards are periodically run through the computer to produce a listing of items issued by quarters number and a listing of items in the warehouse. This computer run also provides an inventory listing by stock number which can be compared to the custodian authorization/consolidated receipt listing (CA/CRL) for inventory purposes.

The formal inventory is taken by using the quarters listing, with items checked off as they are inventoried. **This listing allows a complete inventory of the nearly 1,200 family housing units to which furniture has been issued to be accomplished in four days by only two people. The old manual system used by most bases would require four to five people and six to eight days to complete.**

This streamlined system of inventory management at the USAF Academy has improved efficiency and account accuracy. Overseas bases and others with large furnishings accounts might consider establishing a computer aided system to enhance their inventory control.

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CESMETips

The Air Force Civil Engineering and Services Management Evaluation Team (CESMET) reviews, evaluates and assists base civil engineering and services functional areas in accomplishing their mission in the most effective and efficient manner. This department is designed to pass along new ways to do the job better.

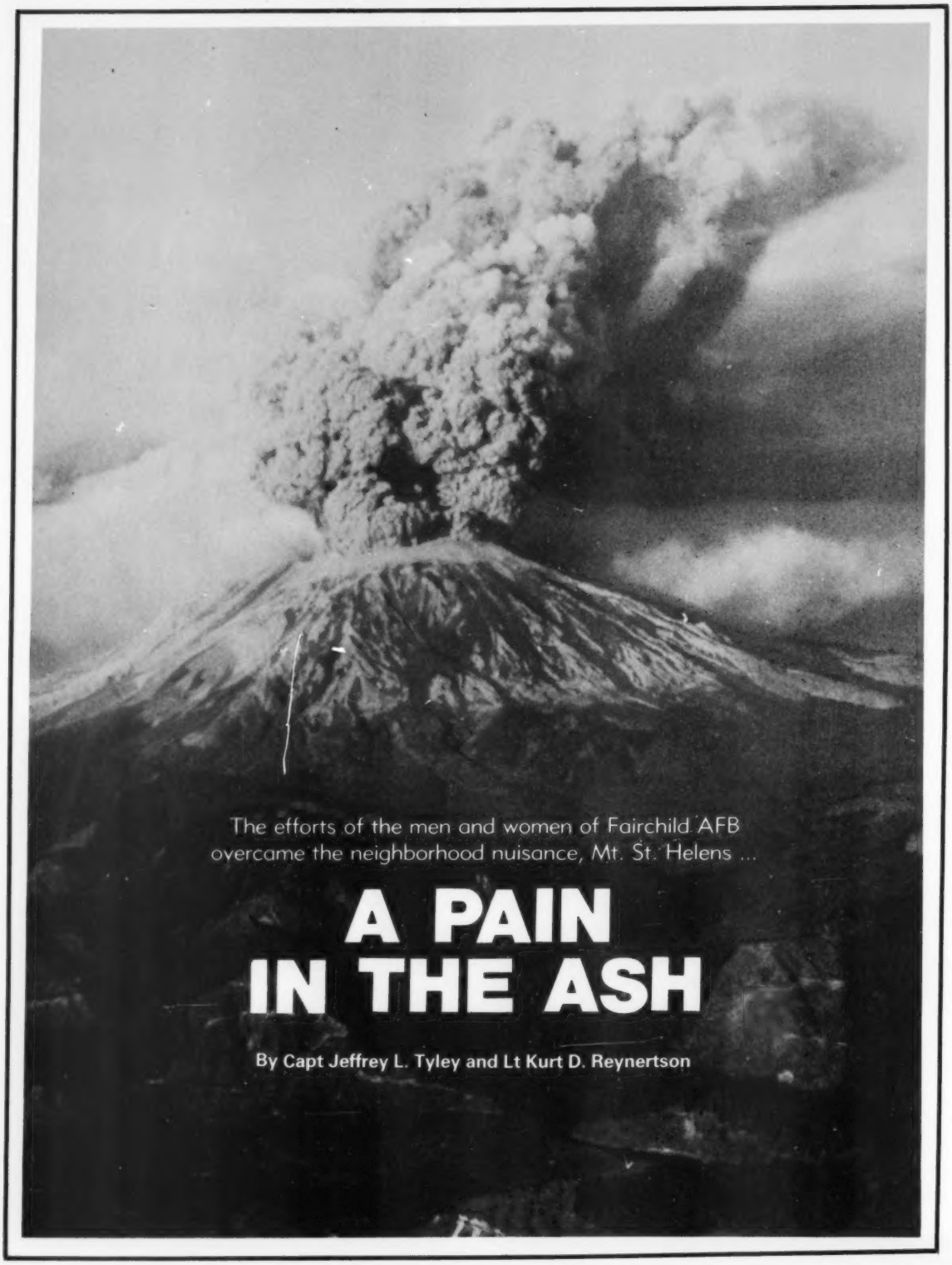
We present certificates of outstanding achievement to base personnel who are doing absolutely "top-notch" work. Here is a list of the recipients for the past three months:

Luke AFB -- Mr Pete Granillo, linen exchange manager.
Maxwell AFB -- Outstanding logistics civil engineering support (LOGCES) unit.
Maxwell AFB -- Exceptional housing referral office service.

FIRE PROTECTION — Many times aircrew members are reluctant to participate in egress training. At some bases this reluctance has been overcome by inviting the crew members to attend and participate in the pre-exercise briefing. The fire chief spends a few minutes with the aircrew members explaining the purpose of the drill. The crew is brought back to the station at the conclusion of the exercise to participate in the post-briefing. This involvement throughout the entire exercise gives the air crew a better understanding of what the fire fighters are capable of doing. It also gives the fire fighters some direct feedback from the air crews. Where this concept is used, fire fighter training is enriched and air crew confidence is enhanced.

SERVICES — Many food service officers and superintendents present briefings during the INTRO briefing about food service operations and the type of services available. At McClellan AFB, the dining hall is included in the INTRO tour of the base. Newcomers have the opportunity to see the kitchen operation and meet the people to contact if they encounter problems. For more information contact Mr Jefferson at AUTOVON 633-6122.

CIVIL ENGINEERING — Training is an important part of civil engineering and directly affects productivity. Therefore, management needs to key in on certain areas to maintain a good program. Involvement by all key players is essential. Training status slides should be presented periodically at the BCE status briefing. Include the number in training by work center/by skill level, number upgraded in past year or quarter, and number of end-of-course failures during same period. Ensure trainers/supervisors have completed appropriate base level on-the-job training courses. Develop an incentive program. While productivity is very difficult to measure, from time to time we see some striking examples of productivity enhancing equipment and systems. For example, at Homestead, use of an airless sprayer and an operator controlled hydraulic lift saves many manhours for the paint shop. At Maxwell the housing referral office developed automated housing listings which give customers up-to-date information on housing in the local area.



The efforts of the men and women of Fairchild AFB overcame the neighborhood nuisance, Mt. St. Helens ...

A PAIN IN THE ASH

By Capt Jeffrey L. Tyley and Lt Kurt D. Reynertson

At 8:32 a.m., Sunday, 18 May 1980, Mount St. Helens erupted after more than 100 years of inactivity. The blast, estimated in magnitude as equivalent to 10 to 50 megatons, created a shockwave traveling in excess of 600 miles per hour. The eruption lifted three-quarters of a cubic mile of material off the top of the mountain and sent ash and pumice over 60,000 feet into the air. The blast uprooted thousands of acres of trees, created floods and mudslides, left hundreds of people homeless, and blanketed the entire area with a layer of volcanic ash and dust. The cost to the civilian community in terms of damage and clean-up was more than $1.6 billion.

Mount St. Helens is located 250 miles southwest of Fairchild AFB. The ash followed an easterly path leaving three-quarters of an inch at Fairchild. With ash well over six inches deep between the mountain and the base, winds blowing this ash field continuously threatened Fairchild AFB with "dust bowl" conditions.

The composition of the ash varied depending on the location of the sample. Samples analyzed from the Fairchild vicinity revealed it was 60 percent silicone and 16 percent aluminum with a variety of other metals including traces of sulfur and chlorine. The ash most closely resembled talcum powder and had a tendency to absorb large quantities of water before becoming fluid. The weight was measured at 65 pounds per cubic foot dry and 100 pounds per cubic foot wet. The ash was extremely abrasive because of a quartz-like formation.

On the morning of the eruption, Fairchild was hosting an open house with over 60,000 visitors present. Notified of the eruption, the base had only eight hours to prepare for the fallout. After cancelling the open house and evacuating the public, the immediate concern became protection of the aircraft. All the aircraft were closed up and sealed with tape. Hangar space was available for the B-52 and transient aircraft; however, the majority of the KC-135 tankers were left exposed on the parking ramps. The vehicle fleet was placed under covered storage and civil engineering immediately began shutting down all utility systems. By late afternoon, the sky was blackened and the ash began to fall, reducing visibility to near zero levels.

Even the wives got into the act.

The coolie operation on the airfield pavement uses two 55-gallon drums on a trailer to haul the ash to the disposal site.

The following day, with the base closed and visibility restricted, civil engineering began examining cleanup techniques. Initial efforts to move the ash dry using powered vacuum and sweeping equipment proved futile and only succeeded in raising additional ash clouds, further restricting visibility. In fact, there was so much ash present in the air that face masks were required until June 11 when the particle count finally returned to safe levels. Sawdust was even tried as a sweeping compound but was abandoned after only creating an additional cleanup problem.

Water was suggested as a medium for moving the ash, but the engineers were skeptical of the resulting effects. It was feared once wet, the ash would form a permanent concrete-like substance. Experiments were performed and proved once wet, the ash forms a heavy clay-like material which, after drying, returns to its original powdery consistency.

Civil engineering crews began using high pressure water to clean the ash from the runway pavement. Once wet, the ash could be worked with graders, snowplows and snow brooms, picked up with loaders and hauled to a central disposal site where it was buried using a landfill technique. After this operation appeared feasible, a request was made to SAC Headquarters for additional water distribution, sweeping, and sewer cleaning equipment. Sixteen additional pieces of equipment from neighboring SAC bases, including an F-6 foamer from Military Airlift Command (MAC), were immediately shipped in to support Fairchild's effort.

After the entire active runway was cleaned using high pressure water, aircraft were launched. The dust clouds raised by the first aircraft made it obvious that high pressure water alone would not give a clean, dust-free pavement. The water did not suspend the ash long enough to be flushed from the pavement. Con-

sequently, the ash quickly settled back into the pavement joints and surface pores. It was evident that another medium had to be used to help suspend the ash.

The engineering branch suggested trisodium phosphate (TSP), a form of detergent used to clean concrete surfaces. The TSP was tried, and when mixed with water, suspended the ash in solution long enough to be flushed from the pavement surface. Estimates were that TSP removed more than 90 percent of the residual ash left following high pressure water application. Aircraft operations on a TSP treated runway resulted in virtually no ash cloud formation. All airfield pavement was cleaned using the high pressure water/TSP technique.

The TSP operation was accomplished using five pieces of equipment in series. The bulk TSP was mixed in a water distribution truck and applied by a spreader bar. The solution was then agitated with snow brooms to suspend the ash and flushed with over 10,000 gallons of fresh water from trailing water trucks.

The base civil engineer cleaned the airfield pavement using the priorities established in their snow and ice control plan. The BCE used two eight-hour shifts per day for over two and one-half months on airfield ash cleanup alone. This method gave several distinct advantages: **(1) permitted the maximum use of daylight hours; (2) better matched the equipment/manpower ratio; (3) allowed the transportation people eight hours each evening for vehicle maintenance.** The last item was particularly important since oil and filters had to be changed every 70-100 miles.

While civil engineering crews were busy cleaning the priority one areas of the airfield, people from other base organizations, including dependents, were manually sweeping the remaining airfield pavement. The effort from this "coolie" operation mopped up so much ash that it was being hauled to the disposal site faster than it could be covered using a bulldozer.

A snow broom follows the TSP application to agitate the ash and suspend it in solution.

Sawdust was tried as a sweeping compound but only created an additional cleaning problem.

Base cleanup presented a series of different problems. The ash was everywhere imaginable and plugged everything from roof drains and gutters to storm sewer lines. Since the ash had a metallic composition and was quite possibly a conductor of electricity, all transformer insulators were cleaned using an industrial vacuum to prevent short circuits. Maintenance on motors and filter replacements were increased on air handling, air conditioning, heating, and refrigeration systems. This requirement will remain as long as the ash is present in the air. Flat roofs presented still another problem since they were a haven for the ash. Winds blowing the ash from the roof tops constantly contaminated previously cleaned areas. Considering the age and condition of the roofs, only experienced civil engineering crews were

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The uniform of the day.

permitted to clean them. Roof cleaning was a slow and tedious process requiring extreme care to prevent damaging the roof surface.

Water quickly became the key to moving the ash. During the three weeks following the eruption, over five million gallons per day were used. Virtually all the catch basins and storm sewers were plugged and constantly had to be opened to prevent flooding the base from this runoff water. Considering the tremendous amount of water used, it was determined that twelve fire hydrants operating at full capacity was the maximum the system would permit. The base then was divided into twelve zones, each with a fire hydrant and a hose. Each zone was commanded by a squadron commander and a 40-man crew equipped with hand tools to physically sweep and hose down the base. This manual effort continued for three weeks following the eruption, using 12-hour shifts.

The cleanup operation was a magnificent effort by the men and women of Fairchild AFB. The BCE alone used over 27,000 hours on ash removal. With the bulk of the ash removed, and only periodic maintenance required, there is constant fear of another ash fallout. But, they are ready, and above all they know what works.

The entire base cleanup operation was planned and executed in a highly professional manner. Each of the steps took constant trial-and-error experimentation until viable courses of action were found. The men and women of Fairchild AFB can be proud of their efforts — they've been tested and they have met the test.

E&S

Cleaning the ash from an apron in front of a hangar. Notice the face mask.

Lieutenant Reynertson *is an industrial engineer in the analysis section, industrial engineering branch, 92d Civil Engineering, Fairchild AFB Wash. He received his bachelor of science degree in industrial engineering from Texas Tech University. He is a member of the American Institute of Industrial Engineers.*

The desire to serve,
the ability to perform, and the
courage to act

Lessons from a Fire Fighter

by Capt Philip M. Ray

An adage we all grew up with is, "Experience is the best teacher." As evidenced by the numerous exercises and drills conducted each year, the Air Force certainly believes and applies this adage. All of us learn from our mistakes. If you're going to fail, the practice field is the best location. Our commanders expect and should see quality performance and 100 percent effort when emergency situations exist. Therefore, we drill and practice throughout the year and when the need arises, we perform because we have honed our skills on the practice field.

Another area in which we learn to do our jobs better is through the experiences of others in both practice and real emergencies. In the following paragraphs, four fire incidents are presented. The lessons learned from each of these should serve as an instructional tool. Unfortunately, this area of learning involves real losses. These were expensive lessons. Read on, maybe you will learn something.

Incident number one:
July 16, 1980, warehouse fire. Total Air Force loss of $124,171. Direct cause: welding metal affixed over wood.

Scenario: A supply technician was working at a desk in the office of the warehouse. Hearing an unusual noise coming from the warehouse, he opened the door to the warehouse bay and immediately saw flames between two wall studs above an eight foot sec-

tion of plywood paneling that covered the lower area of the studs. The noise was the crackling of the fire in the wooden structure. The supply technician returned to his office, called the fire department, and left the building. As he was leaving, he heard the automatic sprinkler system activate.

The base fire department responded within four minutes with a pickup truck and a 530B water pumper truck. The pumper truck didn't work. Nine minutes after the fire was reported, two P-4 crash trucks arrived. Using the two forward turret nozzles, with excellent access to the fire through an overhead supply door, the fire was extinguished in one-and-a-half minutes.

Lessons Learned:

1. The welder did not receive adequate initial and recurrent training in fire prevention. New employees should be provided training. Periodic recurrent training should be established for critical safety areas.

2. Proper precautions were not observed for welding in an area of moderate fire risk. All personnel working in and around wooden structures should be briefed on the extreme fire potential of older woodframe buildings.

3. Wooden doorframing, deteriorated with age and weather cracks, was heated above ignition temperature and subsequently transferred or propagated burning into the inner wall area. A light breeze probably aided this burning movement. Welding on metal affixed to wood will set up a smoldering fire which may remain unnoticed for several hours.

4. No fire detection and alarm system was provided for this building which contained high value, mission-essential equipment.

5. No attempt to fight the fire was made by the supply technician even though a portable fire extinguisher was nearby.

6. The 530B fire truck water pump would not engage properly. This was an intermittent malfunction. Maintenance actions later could not reproduce the failure. Equipment is not always reliable; therefore, backup procedures and equipment have to be preplanned and utilized.

7. One of the water distribution pipes of the automatic sprinkler system fractured and completely separated during the initial stages of sprinkler system activation. This system was installed in 1955 and had been scheduled for modification in 1978. Due to budgetary constraints, this action was delayed.

8. The base fire department was not notified of the welding operation. All operations of this nature should be fully coordinated through the base fire department.

Incident number two:

Apr 15, 1980, base exchange audio center warehouse fire. Total Air Force loss of $118,760 plus $797,896 exchange merchandise. Direct cause: welding around wooden structural members.

Scenario: A 10,300 square foot building was undergoing contractural remodeling. The fire was caused by the contractor welding air handling unit supports to ceiling I-beams. Two by four wooden supports were bolted to the I-beams. During the welding process, hot slag became imbedded in the 2 x 4's. After five hours of smoldering, the wood ignited and became a flaming fire. The building central

alarm system did not activate. It had been disconnected by the contractor three days prior to the fire. Had the system been operational, the fire could have been detected and extinguished in its incipient stage, resulting in little damage.

Lessons Learned:

1. Extensive security devices were installed on the building due to the expensive contents. These were not annotated on the pre-fire plan and thus delayed entrance of fire fighters. The need for current, comprehensive pre-fire plans cannot be overemphasized.

2. The contractor was required to obtain the contracting officer's written permission before interrupting electrical service to the fire alarm system. He did not do so.

3. The contractor was not required by the contract to get approval prior to operating welding or cutting equipment in the building. This should have been a part of the contract.

4. The fire department voice recorder was blank during this fire. Poor maintenance procedures were to blame.

Incident number three:

Apr 30, 1980, radar site fire. Air Force loss $2,655,480. Direct cause (most probable); radio frequency energy arcing, resulting in the ignition of radome panel components.

Scenario: At 1:05 p.m., an employee returning from lunch smelled smoke in the radome. Personnel located heavy smoke and flames at the 50 to 60 foot level on the interior surface of the dome. The fire alarm was sounded at 1:10 p.m. The initial fire fighter response was from the on-site fire brigade, followed by the fire department located 12 miles away. The fire fighting efforts were hampered by falling debris inside the burning structure of the radome. This debris also started several secondary fires involving supplies and equipment on the radome floor. The radome collapsed at 9:45 p.m. By this time fire fighting efforts were concentrated on preventing the spread of fire to other facilities and areas. The fire was under control at 12:51 a.m. and reported out at 6:23 a.m.

Lessons Learned:

1. Air fed this fire through bolt access holes and interior seams on the radome surface.

2. Pre-fire plans should have been developed and exercised for all radome facilities to include the use of the pedestal ladder, elevated work platforms and large capacity hose lines.

3. Large hose line dry standpipes should have been provided in the radome for fire use only.

4. An installed smoke detector, in lieu of the present heat detector, would probably have provided earlier warning.

5. The fire alarm should have been sounded immediately upon the detection of smoke.

6. Storage of non-essential equipment and supplies, especially combustibles, on the radome floor

should not have been allowed. In this case, the ignition of the contents of a waste oil drum increased the intensity of the floor-level fire.

Incident number four:
Jan 10, 1980, NCO club fire. Total Air Force loss of $105,073. Direct cause (most probable): careless disposal of smoking materials.

Scenario: Security police reported the fire to the base fire department at 3:59 a.m. This was about 4½ hours after the club had closed. The fire spread rapidly through the building and it was totally engulfed in flames by the time the fire fighters arrived at 4:07 a.m. They were delayed due to severe ice and snow road hazards. Realizing the building was a total loss, the fire fighters concentrated their efforts on containing the fire and protecting the surrounding dormitories. The fire was extinguished at 5:13 a.m.

Lessons Learned:

1. Several unsafe conditions existed.
   a. Self-help projects did not meet the fire and electrical standards.
   b. Previous fire safety discrepancies had not been corrected.
   c. The building was not equipped with a fire detection system.
2. Employees did not adequately follow prescribed club closing procedures. Specifically:
   a. The closing checklist was not followed.
   b. Trash cans were not emptied.
   c. Smoking materials were not properly disposed.
   d. Nonessential electrical equipment was not unplugged.

These four incidents total approximately $3 million in Air Force losses and $1 million in non-Air Force losses. These lessons learned, taken from the final technical reports and inspector general findings, were certainly very expensive. Human factors played a significant role in each of these fires. **If** the welders had been more careful; **if** the budget had allowed for the installation of a detection/suppression system or the upgrading of an older system; **if** the radome had not stored combustible material; **if** the fire pump had been updated; **if** the club had been properly closed; **if** they had only checked with the fire department prior to their self-help project; **if** ... ? We could keep asking the question forever!

This need not be the case. You can help prevent similar fires today. Take a look around you and your work area and be fire safe. If you have any questions or are unsure of any existing condition, your local fire fighters will help you!

The Air Force fire fighter motto is "The desire to serve, the ability to perform, and the courage to act." This denotes the fire fighters readiness to do their part but nothing would make them happier than to have you make this task unnecessary.

Captain Ray *is a civil engineer specializing in fire protection and prevention at the Air Force Engineering and Services Center. Under the airman education and commissioning program, he graduated from Oklahoma State University with a bachelor of science degree in civil engineering. He served in the Strategic Air Command as a radar-navigator instructor and wing staff officer. He holds a master of science degree in facilities management from the Air Force Institute of Technology.*

FUNDS MANAGER'S FUNDS STATUS BOOK...

A Priceless Tool for Management

by Betty Wittman

Calling all funds managers! How many times have you been called on the intercom by the base civil engineer (BCE) wanting to know the supply expenses as of the end of last month? What the due-outs were? What the dollar balance is? You reach for the project funds management record or your ledger sheet, call him back and pass on the data. "Good," he says, "Now how does that compare to last year?" Another flurry going through operating budget ledgers, ledgers, etc. Or the call from headquarters asking about fuel requirements or utility consumption? How many places do you look or how many calls do you make?

The type of data we funds managers are expected to have at the tips of our fingers seems unbelievable. How many overtime hours used last year for snow removal? Why are this year's hours so much less than

previous years? If average consumption of gas in military family housing (MFH) has been consistent, why is consumption this year so much higher? How much does it cost to rent a tandem roller? How many miles to Site 2?

I'm sure all funds managers have devised various records to answer these questions with the least delay. My "defense mechanism" several years ago was a simple notebook — easy to put together and easy to maintain — containing "easy-to-track" data. After all the end-of-month reports are in and the last sales slip for contractor-operated civil engineering supply store (COCESS) buy has been signed, the various reports for the "funds status" books are compiled. Three copies are kept — one by the BCE, one by the deputy and the other by the funds manager. The following is a list of the data currently contained in the "funds status" books:

• **Average funds status:** Lists by major category (civilian pay, travel, rentals, utilities, facility projects, services, misc contracts, supplies, equipment, fuels) giving funds authorized and expensed by current and prior year.

• **Detailed operation and maintenance (O & M) breakout:** Lists by element of expense/investment code (EEIC), the initial and the current requirement, current authorization and expense plus prior year expense.

• **MFH status:** Lists by EEIC the initial and current requirements, current authorization and expense together with prior year expense.

• **Detailed MFH breakout:** Separates P721 and P722 and lists by EEIC current authorization and expenses and prior year's expenses. Also contains direct hours.

• **Supply status:** Contains breakout by source of supply (i.e., COCESS, stock funds, contractor-operated parts stores (COPARS), misc) reflecting authorization, expense, balance and due-outs. High dollar expenses and due-outs are reflected (i.e., runway repair, steam shutdown, roof repair, topsoil, asphalt, etc). Dependent on the time of year, this report is prepared every two weeks and then weekly. This status report is also sent to the chief of operations.

• **Supply breakout:** Reflects expense by type of supply or by work order category — bench, shop, base service store individual equipment, tools, collection, planned for current and prior year.

• **Overtime status:** By month reflects hours and cost (with separate breakout for snow removal showing hours, dollars, snowfall and snow days) for current and prior year. High hour usage is identified by subject (i.e., power failure, road repair, etc).

• **Fuel status:** By month, current and prior year, reflects No. 2 and No. 6 fuel oil consumption and expense and includes degree days.

• **Utility status:** Contains water, sewage and electrical consumption and expense for current and prior year. Separate reports are prepared for O & M and MFH which also reflects data on gas.

• **Shop rates:** Reflects shop rate by category, cost of direct and indirect supplies, availability rate and supply cost by manhour.

• **3080 data:** Reflects current year requirements and buy status.

• **Reimbursements:** Contains by sales code the reimbursement authorized and earned.

• **Travel:** By category (training, administrative and mission) reflects authorization and expense for current and prior year.

• **Historical:** Contains various reports, such as (1) a breakout by EEIC showing expenses for seven prior years, (2) facility project funding by type (maintenance/repair/minor construction), separately for O & M and MFH indicates headquarters or local funded for past 18 years, (3) percentages of supply dollars expensed by type (bench, bulk, planned, etc) for past seven years, and (4) overtime hours and dollars for past nine years.

By no means are all the holes filled, but a quick look in the funds status notebook has answered questions time and again without time-consuming research of stat runs or ledger books. The book has been a great aid at budget preparation time and during various inspections. Other status reports are already, or will be, in the making as interests are redirected or problems are encountered. The funds status book has become a priceless tool at Griffiss AFB by providing a fingertip reference to management.

Betty G. Wittman, *a graduate of Utica School of Commerce, has been employed by Griffiss Air Force Base for 38 years, the last 14 as BCE funds manager.*

THROUGH THE EYES OF THE CUSTOMER

Improving Base Services

by Maj Jack W. Barbeau

As a services officer or manager, are you interested in additional ways you can improve the service provided by your operation? Or, are you new to the career field or your current job and don't have the experience to know what could be done to improve your functions? Maybe you need some ideas for improving the service you provide by looking at each of your services operations through the eyes of your customers. After all, you'll never have a truly fine operation until your customers also perceive it to be a good one.

Basically we're going to take a common sense approach to improving your billeting, food service, and linen exchange operations (and the commissary and base exchange activities, as well) by walking through these operations as a customer. If something doesn't look right, it probably isn't. Take immediate action to eliminate irritants and the "little" things — for they may not seem so small to your customers. (And, when the IG or other visiting teams notice them, which they will, you will need to correct them anyway.)

Well, let's get started!

BILLETING

Look first at your billeting operation, since it is often the first and sometimes only impression a person gets of your services functions (and of the base as a whole).

Can you find the billeting office easily if this is your first time on base? Are there signs clearly leading to a well-identified billeting office? Could you find it at night? Are there plenty of parking spaces in the parking lot? Do the employees or the customers get the best parking spaces? Does the entrance allow entry (or exit) from both directions, or do people with suitcases have to put them down, pull and prop the door open ... ?

What's your impression of the entry lounge and reception desk? They should be neat, attractive, and inviting. Think Sheraton or Ramada Inn — there you don't see bulletin boards, Scotch-taped signs, etc. Is the reception desk large enough to handle more than one person at a time, or is it a "cage," secure, but giving you the impression that the person on the other side is a teller rather than a reception clerk. Do desk clerks change shifts at normally busy periods — and do they close the operation when making changes? If so, change the procedures as no tired visitor wants to wait 10-15 minutes for this to happen (it doesn't happen downtown in a good hotel). Desk clerks should be neat in appearance, able to work under pressure, and always be **courteous** — a smile goes a long way with tired visitors.

Are sundry toiletry items available for sale? An attractive (dusted occasionally) display of examples (not a full stock of products) of each item available is helpful. Offer **at least** the most commonly needed items — and offer the most popular types of items, i.e., don't offer only double-edged razor blades when most people use the Trac II variety.

How good is your reservation system? Nothing upsets a person faster than to get the garbled word on reservation policy, or worse yet, to arrive and find that billeting knows nothing of the reservation. (How would you feel?) Contact some newly arrived people periodically to see what their experiences were with your operation.

The best billeting operations are more than handing the transient a key and collecting the bill at checkout time. Your operation should do everything reasonable to make sure guests are comfortable through their stay with these items considered essential and significant: quiet rooms (solid doors that fit snugly to the floor go a long way toward improving privacy — and carpeting in corridors goes a long way to cut down noise from early/late arrivals and departures); good beds and pillows; a clock radio (and operating instructions); comfortable room temperatures (individual room thermostats are best); color television (Does it work well? Check — then see if it is in a logical location); coat hangers; soap (please, not the small bars — there are medium-sized ones that you can hold on to that don't break); towels (two please); drain plug in the bathtub (for those who want to take a bath instead of a shower); bath mat (cloth); drinking cups; ice; ash trays; coffee maker; and a nice permanent folder which contains **current** information, such as bus schedules, a good base map, telephone directory, location and operating hours of government and commercial dining facilities,

BX activites, TV schedule, theater schedule, and guest evaluation or critique forms. How about a little wallet-sized card that people can take with them with the most frequently called numbers and operating hours on it? Are phones nearby (ideally, in the rooms) with on and off-base directories in good condition? A small refrigerator is nice, especially for visitors staying a few days. It sure is convenient when there are concession machines, a newspaper "stand," and a stamp machine in each building. How about writing supplies, an extra blanket, and a fly swatter? These things, you say, are obvious — no big deal — however, your rooms and buildings are probably missing more than one of these conveniences!

Are your rooms attractive, with nice color coordinated furniture and furnishings? Does everything work in the rooms — lights, faucets, toilet, heating and air conditioning? Are drapes and shower curtains hung correctly? (Include such items on the maids' checklist.) If you really want to identify (and correct) hard-to-find inconveniences, stay in a few of your rooms periodically — the best way in the world to "debug" a room. And don't forget to "debug" the VIP rooms!

Remember, most people have stayed at nice motels. They will compare your room with their previous good experiences.

FOOD SERVICE

Next, let's visit your food service operations.

Has the base provided adequate parking for dining hall patrons — especially for the noon meal crowds? Food service facilities should have signs outside prominently identifying the facilities and their hours of operation. Do your facilities always open for business on time?

Do your cashiers know what to charge if you are an officer TDY on per diem (a lot of them don't)? Do your dining room decor and background music (without the din of the dishwasher) create a very pleasant restaurant-like dining experience? If not, they should. An attractive menu board before arriving at the serving line is very helpful. Are your serving lines attractively presented, with well-prepared and garnished foods? Fogged up sneeze guards are a common occurrence,

making it difficult to see the food selection. Are tray slide rails wide enough to preclude tipping and available along all portions of serving lines, beverage counters, and salad bars? Silverware, dishes, and trays on the serving line should not be wet or hot! Better planning and more dishes will solve this problem. However, warm, dry plates are recommended for keeping food hot while the patron travels through the line.

Is the hot food hot (minimum of 140 degrees) and cold food cold (maximum of 40 degrees)? Courteous and attractively dressed serving line people pay dividends. Smiles and courtesy are contagious and cost nothing. How long were you in the serving line? If it normally takes more than six minutes, you should try to determine what you can do to reduce this time. Excessive waiting in line is one of the biggest irritants to your patrons.

Here's the zinger — how does the food taste? (The best tasting foods are usually found where recipes are followed to the letter.) Visit the dining facilities before a meal and taste a sample of everything prepared! Insist that cooks or shift leaders taste-test the food items before serving. Surely they aren't afraid of their own cooking!

A common complaint is that the food variety and quality are poorest on week ends. If you use the two-meal concept, remember that its purpose is to ensure attractive meals on week ends (make full use of the allowance). Have a good meal variety (and advertise it) on the snack line. Do you frequently offer roast beef, corned beef, pastrami, and Reuben sandwiches? If not, why not? They are popular. Why not tacos, pizza, fried chicken and fries, fish fillet sandwiches, etc., a couple of times a week? While we're at it, do you offer hot, fresh doughnuts and sweet rolls at breakfast meals? Hot chocolate?

Don't blow all these good ideas by running out of main entree items before the meal period is over — this really gets patrons upset! And you owe it to those patrons eating at the end of a meal period (who have probably been working) to offer the same variety and attractive layout that existed at the beginning of the meal.

Specialty meals can really be made popular. For example, on the day the Mexican meal is served, why not have your people wearing sombreros, appropriate Spanish tape playing over the music system, etc. Be imaginative! Put some "pizzazz" in your dining facility and make it the showplace of the base.

In the best operations, the shift leader really gets around to frequently observe how the job is getting done — behind the serving line, in front of the serving line, and in the dining room. Further, the serving line should be kept neat and clean — throughout the serving period. Each person on a shift (including food attendants) should have specific responsibilities, which are clearly indicated in the cook's worksheet or other instructions. Are food attendants keeping dining tables cleared of dirty dishes, and are tables and chairs kept clean (and nicely arranged) throughout dining periods?

Suggestion boxes are good. But periodic

questionnaires are even better along with frequent talks with the patrons to determine what is **really** important to them, and if your programs are effective, or what else (or instead) you should be doing to provide the best service. A hint — be sure to ask enough questions to ensure you understand if there is a problem. If a patron says the food isn't very good, ask for specifics (you might find out that what is meant is something else — like you don't give seconds on items, or a server was rude, etc.).

LINEN EXCHANGE

Let's now look at your linen exchange.

Can you find it easily? It should have a sign outside the facility prominently identifying it and its hours of operation. Operating hours should not be restrictive. For convenience it should be located near the major dormitory area. Is the customer service area functional and attractive? You know, a counter adds a nice professional touch.

Be concerned with the condition of the linen items you are providing your customers. They should be clean, pressed and not deteriorated because of poor laundry support.

COMMISSARY

Your relationship with the commissary and base exchange functions is one of being a consumer — that is, determining if these functions are providing adequate service to their customers. Let's begin our visit to the commissary as a customer.

First, does the commissary have a sign outside the facility prominently identifying it and its hours of operation? Do the shopping hours provide convenient shopping for most people? There should be adequate parking to handle busy periods.

Think Safeway or a supermarket downtown that you are impressed with. What does your base commissary need to do to match its service? Perhaps what follows will give you some ideas. (And always remember that there are four areas that will most likely determine customer opinions of the store: the produce section, meat department, how well the shelves are stocked, and how long the wait is in the checkout lines.) Is the produce displayed fresh, sized, and properly trimmed? The prices of each item should be obvious. One hour prior to store closing do fresh meat displays still reflect variety and quantity? Do shelves reflect complete stocking without voids or partial stockage? Prices should be displayed on all merchandise for customer convenience. During normal activity days (other than payday periods), waiting in checkout lines should be minimal and not exceed 7-10 minutes. Is the express line identified by a prominent sign? Are management personnel present during all hours of operation? They should be readily noticeable in colorful blazers.

BASE EXCHANGE

Most of us often have shopped in the base exchange facilities. So this should be an easy area for you to evaluate. Maybe, though, you'll see something here that could improve service that you hadn't given much thought.

Is there adequate parking at all the exchange outlets to handle busy periods? An adequate supply of merchandise should be stocked and attractively displayed. Are there empty shelves? Is there a good variety of popular minority merchandise — to include toiletries, greeting cards, magazines, and mod clothing. Does your base exchange provide these service activities: laundry/dry cleaning, barber shop, beauty shop, tailor shop, optical shop, watch repair, a florist?

Are employees helpful and courteous? Are all vending machines well stocked and in good working order? Are waiting times in checkout lines excessive? And here's a good one: What about waiting times at the special order and refund sections? And gee, it sure would be nice to be able to sit down while waiting or looking through the special order books!

Clothing sales store operations are very important. Out-of-stock conditions should not exist for popular sizes of clothing. Are special order services publicized? (If not, customers may complain that an item is never available, when in fact it may be strictly a special order item only!) How about a professional sign on the exit door asking patrons to see management if they have a question on an item(s) not available! (This is not a requirement, but it sure can pay dividends.)

Another helpful touch — neat signs placed on shelving to identify out-of-stock items and get well dates. (Otherwise, bare shelving gives a very negative impression.)

A FEW FINAL NOTES

To improve your services activities you will have to see them on a regular basis (and it will give you a refreshing opportunity to get out from behind the desk and all that paperwork). Recommend you set up a schedule for seeing **every** room in your billeting facilities — you might be surprised at what you find! This brings up an important point: whenever you direct a change, it will pay you to follow-up to see for yourself that it has been accomplished — and the way you intended.

Well, that's about it. You and your people will think of numerous other ideas for making your operation one of the best in the Air Force — and we'll all benefit.

Good luck!

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At Luke, a bold program took the linen exchange building

From Worst to First

by Lt Col Norman D. Shady

Base linen exchanges traditionally have low priority for facility upgrade projects. On many bases linen exchanges are given "left-over" space that nobody else wants. These facilities are often drab and far from attractive. However, this does not have to be the case — aggressive and innovative action by management can contribute significantly to the image of linen exchange.

The manager of the Luke AFB, Arizona, linen exchange, Mr. Epitacio "Pete" Granillo, decided that his facility did not have to be the eyesore of the base. He recognized the importance of the linen exchange to a significant number of personnel assigned to the base and felt that they deserved an attractive and comfortable atmosphere to accomplish their weekly linen exchange responsibilities.

He set a goal to make his shop one of the best and one that would be known throughout the Tactical Air Command (TAC) and the Air Force. As a result the Luke AFB linen exchange was labeled outstanding by the TAC civil engineer and services management evaluation team (CESMET); rated outstanding by the TAC management effectiveness inspection team and the Air Force CESMET; and given a perfect score by the 12th Air Force base evaluation team.

The Luke AFB linen exchange personnel are justifiably proud of their facility. It is a showplace among linen exchanges in the military. They can take personal pride in their facility because much of the work, both inside and outside, was done through their own self-help projects.

How did they do it? The answer in general terms is teamwork, determination, knowing the proper techniques for getting work done through civil engineering and self-help.

The Luke linen exchange was a dilapidated old building with ample space and in a location convenient to the dormitories. The base civil engineer contributed significantly to the upgrade program by covering the exterior of the building with aluminum siding, constructing a loading ramp, and repairing numerous building deficiencies commonly found in 1940-vintage buildings. However, the finishing touches — the touches that make the facility a showplace — were accomplished through self-help projects which included:

- Landscaping the grounds around the facility.
- Constructing a professionally appearing customer reception/exchange counter.
- Building enclosed dry cleaning storage rooms adjacent to the employee side of the customer counter.
- Lowering the ceiling and spraying-on acoustical material.

- Installing cabinets for storage of clean linens.
- Paneling walls in the facility.
- Constructing a lounge area which is used for informal meetings of small groups.

In several instances linen exchange personnel were not experienced in certain skills, but they gained the necessary "know-how" by watching others.

It is possible for any base to do what Luke AFB has done. Linen exchange managers must have a master plan for their goals, be constantly aware of possibilities to achieve these goals, and take advantage of any opportunity which may be of benefit to the master plan. For example, to complete the landscaping project, the Luke AFB manager obtained cacti, palm trees, and other plants that the State of Arizona offered to government agencies prior to beginning excavation for a new interstate highway.

Although the facility is now widely recognized as outstanding, the Luke AFB linen exchange personnel are not resting on their laurels; they recently completed plans for fiscal year 1981 improvements. E&S

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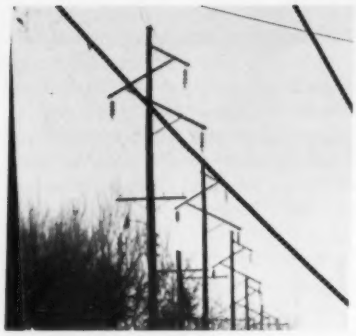

Few bases have a chance to implement their base recovery plan ... McConnell AFB was one of the chosen few during

The Blizzard of '79

by Capt Ronald Andreas, Jr.

The test of any plan is how well it works. Exercising plans is often the point of staff assistance or inspector general visits. The primary reason for exercising plans is that usually there is little margin for error in situations when they must be implemented. The base recovery plan is no different. It is designed for emergency operations of base civil engineering during contingencies, natural disasters or emergencies of any kind. Few bases, fortunately, ever have a chance to implement the plan. McConnell AFB, Kansas was one of the few during the "Blizzard of '79." The scenario was more complicated than the most devious any inspection team could devise. But the challenge was met with concerned, dedicated military and civilian personnel and a good base recovery plan to guide the actions.

The situation began late one Friday night on January 12, 1979. Nearly the entire state of Kansas was hit with a severe ice storm followed by blizzard conditions. At McConnell AFB six inches of snow already lay on the ground from a snow storm the previous day. The latest storm dumped two more inches of snow, left a quarter-inch of ice from freezing rain, and 30 to 40 knot winds continued through the night as temperatures dropped below zero. Snow, freezing rain, ice pellets, fog and high winds often reduced visibility down to 100 meters.

When the snow control officer of the 381st Civil Engineering Squadron came on duty at 11:00 p.m. that night the light freezing rain gave a hint of pending bad weather. Little did he know that this night and the next day would be one to be remembered for many years. The control officer did not have to wait long for the effects of the storm. Around 11:30 p.m. the base and the missile sites lost commercial power. All missile sites were able to maintain their alert status by switching to diesel power, but base power stayed off for several minutes and was fluctuating on and off once power was temporarily restored. At that point the base recovery plan was partially implemented with the first calls made to the electrical superintendent and the base civil engineer. The base civil engineer initiated a partial recall of power production and exterior electrical personnel including key civilians. From then on as the temperature dropped, action heated up in civil engineering.

At midnight we received the first report of several power lines down. Crews were dispatched to assess the damage and fix the lines, but at 2:00 a.m. the base suffered a total

Kansas Gas and Electric crews work to restore power to the McConnell AFB substation

power loss. Again we dispatched crews to track down the problem. Ten minutes later a large 10-inch water main had broken along the main street. The standby plumber found two breaks in the line. In trying to cut off the section, one valve would not hold. Due to the severe weather conditions we decided not to fix the line at that time. Meanwhile the electrical crews determined the power failure had occurred off base. Kansas Gas and Electric Company (KG&E) was contacted at regular intervals, but by 4:00 a.m. they still had not determined the full extent of the problem. Not until 7:00 a.m. was the outage traced to a substation failure. And the report was disaster. The main substation was so badly damaged that the power company was unsure of the repair time; one other substation was severely damaged, and lines were down all over town.

Finally at 9:00 a.m., Saturday, Kansas Gas and Electric representatives stated that power could not be restored to the base until noon at the earliest, and they were not too optimistic of that time estimate. With that information the base commander gave the word to fully implement the base recovery plan. As a part of the plan, McConnell AFB has a section called the severe weather contingency annex. The annex includes these steps to take in the event of a prolonged power outage in extremely cold weather.

- Initiate full squadron recall.
- Establish damage control center.
- Provide standby power to 10 key facilities.
- Prevent water tower from being drained.
- Initiate preventive measures against boilers, water lines and sprinkler system freezing.
- Alert building custodians to dangers and action needed.
- Apprise the major command of the situation.
- Ascertain cause and duration of the outage.
- Establish 12-hour work shifts.

The pressure was on. Six hundred military families were without heat and electricity. Hundreds of unaccompanied personnel faced the same situation in the dormitories. Heat to all base facilities was off. Four major waterline breaks were leaking badly.

In view of the situation the haunting questions surged up. Was the plan adequate? Would it work? Could the recovery force respond as trained?

The community was not in much better shape. And the runway was closed due to the ice so help from the outside was not available. All attempts to open the runway failed; we were on our own.

Shrugging aside the unanswered questions, the recovery force set about its task. We established the damage control center and crews were sent out to provide standby generator power to the key facilities. Those facilities on backup power had transferred successfully so no further action was needed there. The first three priorities on the remaining list were the sewage lift station, the base dining hall and the officer's club boiler room that also fed five dormitories. If a generator was not provided to the sewage lift station, a large overflow would pollute the Arkansas River creating a serious health hazard. The base dining facility and officer's club were needed to feed all the military personnel and their dependents.

Action was started at once to mobilize the standby generators. It took the power production personnel hours to get the generators operating due to frozen batteries and other problems. Late afternoon arrived before standby power for the three priority facilities was provided. Throughout the day civilian and military personnel reported in for duty. Fire department and plumbing shop personnel concentrated on draining the many, wet deluge sprinkler systems around the base to avoid frozen pipes. Heat shop personnel were trying to drain and secure as many boilers as they could. Roads and grounds crews were busy with snow removal operations. Several attempts to open the runway by the runway snow removal crew proved futile. The runways and taxiways were too badly iced over. Concurrently, street crews were sanding the treacherous icy streets. Sanding operations continued throughout the critical period.

Outside the base, state authorities reported 35,000 homes were without heat. The situation was looking bleak. While the civil engineering crews were operating during the early hours of Saturday, planning for the continuous feeding and the provision of heat for all base personnel and families was ongoing. Emergency fireplace heat was provided in the base recreation center and NCO club, so that base personnel could gather to get warm.

As the day progressed, reports of frozen boilers, broken water pipes, etc. filtered into the damage control center. Announcements were made throughout the base to keep faucets open to prevent freeze up. Following the recovery plan, a water shop craftsman was sent to the base water plant to bypass the water tower. This procedure allowed us to use incoming water directly, thus preserving the water in the water tower for emergency fire use. By maintaining the base water supply system during the crisis, we prevented any possible health hazards.

At 3:00 p.m. KG&E was contacted again. This time the report was no electric power until the winds died down. Everytime they would connect a line, it would

snap because of the high winds. Finally 19 hours after the outage, power was again restored to the base at 9:00 p.m., Saturday. Civil engineering personnel immediately began restoring heat to the dormitories. All of base housing had their heat restored when the power returned. During this time, the civil engineering damage control center received 168 emergency calls for repairs. We used 1650 manhours throughout the weekend, providing emergency operations.

Early Sunday morning, we began assessing the damage. In addition to the four large water main breaks on base, we discovered eight facilities with frozen boilers resulting in system breakage; the child care center, base chapel, bowling alley, 384th Air Refueling Wing job control, 381st Strategic Missile Wing headquarters, base legal office, conventional munitions, and the dental clinic. We also discovered 75 domestic water leaks, but this was just the tip of the iceberg. No one knew how many broken water pipes existed behind the walls. Not only did civil engineering start restoring the base, but we also helped KG&E at their request.

With the immediate crises over, we now concentrated on getting the heat on in the eight facilities with frozen boilers and preparing for the big thaw. When frozen plumbing fixtures thawed, there would be water leaks everywhere. As predicted once heat was on, the service call section was swamped with calls of broken water pipes. One big problem encountered was getting into facilities on Sunday; many building custodians could not be determined or located to gain entrance — a problem since corrected.

The next portion of the recovery operation involved the plumbing shop. All plumbing shop personnel worked around the clock to fix or isolate broken water pipes. We found buildings with cracked toilets, broken flushometers and even split cast iron pipes. It was a disaster. Several days were necessary to isolate all the known leaking systems.

The next phase of the operation was the repair of each plumbing system and the restoration of the facility to its former condition. This was accomplished by using the structural maintenance and repair team (SMART) concept. We modified the plan by establishing five special SMART teams consisting of two carpenters, one painter, one mason, one plumber, and one electrician. Each team was assigned an area of the base. Priorities were living quarters, living areas, operational areas, service areas, and finally general repair. With these priorities in mind, the teams set out to do their repairs. In several dormitories, as many as 70 water leaks were located and repaired. Each time we turned on the water, a new leak was discovered.

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After two weeks the teams had restored all known damage within their areas. Approximately 99 percent of the facilities were back to their prestorm status. One facility, the base bowling alley, was in such bad shape with a frozen, broken heating system that we had to spend $25,296 on an emergency contract to get it back in operation. Six months later, repair work was still continuing in the two largest hangars which had multiple frozen heating coils and broken water pipes. But the recovery plan did work and the recovery force met the challenge. No lives were lost, the missile facilities stayed on alert, and the base was placed back in operation. The rapid response of the civil engineering unit averted a potential major disaster.

We learned several lessons from the "Blizzard of '79."

- First, never underestimate the importance of the base recovery plan. A good, realistic plan is vital. Include annexes on the most likely accidents, natural disasters or severe weather occurrences. The plan must address what to do to preserve life and minimize damage to Air Force property. Work priorities and allocation of scarce resources must be predetermined. A step-by-step approach is recommended to ease plan implementation. When working by flashlight in a cold, confused environment, it is a warm security blanket to know that a plan exists, where it is and how to use it.
- Second, once the decision is made to implement a plan, the following action must be quick and decisive for maximum effectiveness. For this to happen every individual needs to understand his role and how to carry it out. After plan implementation is not the time to sit down and determine what your job is. Practice and exercising will insure an effective response.
- Third, plans are guides. Don't worry about modifying the plan during the crisis if needed to match the situation. If we could predict "who, what, when, and where," then and only then could we prepare a plan to cover every "how" encountered.

Since the storm we have updated our base recovery plan using the experience gained. But even with the old plan, the 381st Civil Engineering Squadron proved the validity once again of civil engineering's "Can Do" motto. We were ready when the crisis happened, and we will be ready if it happens again. E&S

Engineering design has been around as long as the requirement has existed to transfer a customer's need into a contractor's instruction. So the need for design is not new. Rising labor and materials costs and increasing competition for funding are also nothing new although pressures may be higher. Add in aging facilities and dollar erosion from inflation and frustration often rises along with the pressures.

In the past the engineering design section at McClellan AFB found itself caught in the middle of changing local priorities and increased customer demands. Design breakage soared as high priorities suddenly changed to low priorities. Fewer design completions meant fewer dollars allocated for projects. In the midst of this vicious cycle, something had to be done. What was accomplished may be considered as a blueprint for design.

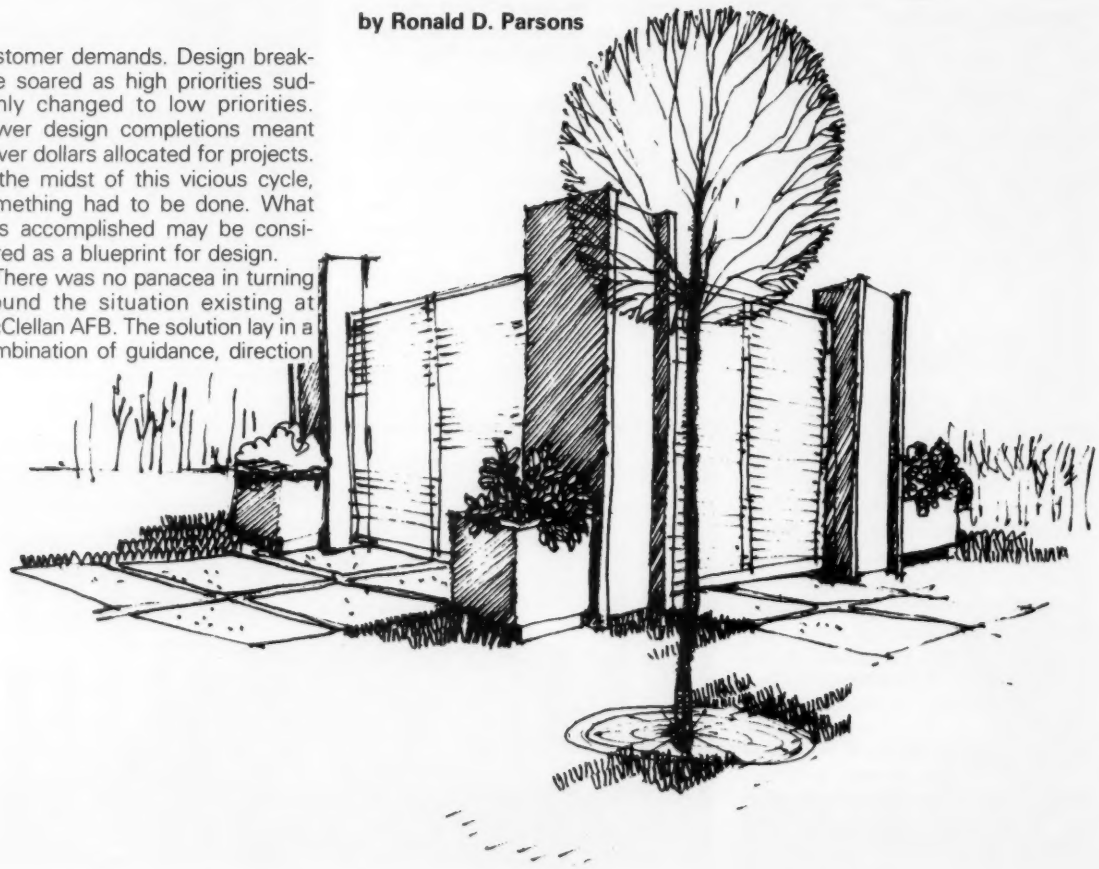
There was no panacea in turning around the situation existing at McClellan AFB. The solution lay in a combination of guidance, direction and joint efforts and coordination between Air Force Logistics Command (AFLC) staff engineers and base engineering personnel. It started when AFLC said, "No more. If a new project is to be placed high in priority against the initially established (design) listing, a trade-off of a priority project must be made." This forced a hard look at a project's real and comparative importance. The result was not a design program "locked in concrete" — rather stability with essential flexibility was the outcome. Further stability was created by the AFLC/DE through establishing a solid, two-year program. This, in turn, led to what is termed the "shopping list program." Early recognition of probable funding levels is determined by the AFLC staff so that the base can design projects to match the probable level of funding.

While this results in a greatly increased workload at headquarters level, it should return to normal following the initial effort in reviewing and validating local program projects. It enabled the design section to cope with a program which has more than tripled in numbers of projects per fiscal year over the past three years.

When design breakage soared, fewer completions meant fewer dollars allocated for projects. What was accomplished at McClellan AFB to correct this vicious cycle may be considered as a

Blueprint for Design

by Ronald D. Parsons



Approximately one third of the design program is comprised of the directorate of maintenance industrial fund (DMIF) projects which are unique to AFLC. DMIF funds are immediately available at the first of the fiscal year and must be expensed or paid to the contractor within that fiscal year. In previous years, the program was developed, validated and designed concurrently with the operations and maintenance (O&M) program of Force Program 7 (FP-7), effectively precluding expensing of DMIF funds and resulting in large carryovers to the following year. Again, through the cooperation of AFLC headquarters, this program was "accelerated" to provide development, validation and design such that DMIF project construction is initiated at the first of the fiscal year for which programmed.

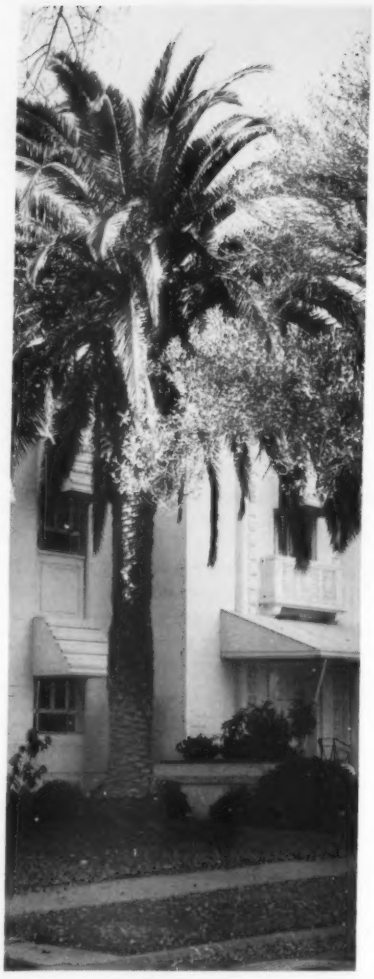
Within the FP-7 program, three "levels" are established. **"Planned-for-funding"** are those projects which must be designed no later than November of the fiscal year. **"Design level"** are those current fiscal year projects which must be designed no later than June of the fiscal year. **"Advance procurement"** projects are those future fiscal year projects in the probable funding level category which must be designed no later than early August of the current fiscal year. Military family housing, non-appropriated fund and tenant project design completions are similarly dictated.

Scheduling of individual projects within the various programs is impacted by a variety of factors. **First,** and foremost, is the customer's need date or facility need for maintenance and repair work. **Second** is the priority of the project within the specific program area and its relationship to the time of funding. The **third** factor is quite critical and concerns the availability of the specific design skills required by the individual project. The **fourth** factor, affected by the preceding three, is design time availability.

Against these factors, a "one-two-three-" in-service design priority list becomes meaningless. The critical baseline for design accomplishment priority becomes the need date versus available skills. The use of architect-engineer (A-E) contract services now comes into consideration. This adds a **fifth** factor, the six percent limitation on A-E design fees and the estimated construction cost of a project or projects. This factor affects and determines those projects which can be placed for A-E design. An A-E firm is generally not willing to accept a design contract on a small construction or a multiple-discipline project because the paperwork and design costs are not covered by the allowable fee. This means the smaller, multi-discipline projects remain for in-service design and the larger projects go A-E. For example, in the FY-80 FP-7 and DMIF programs, 44 projects totalling $7,453,800 were placed with A-Es and 71 projects totalling $7,519,000 were designed in-service. Although 27 more projects were designed in-service than placed with A-Es, the total dollar amount was only $65,200 more than that of the A-E projects.

Scheduling then becomes not a matter of "this one first, this second, this third," but "these by this date, these by this date," and so on. The three other factors which can adversely affect the design schedule throughout the year are inadequately defined scopes of work, erroneous cost estimates, and incorrectly estimated design man-hours required.

As previously noted, a large A-E



HQ 2852 Air Base Group
McClellan AFB, California

HQ Sacramento Air Logistics Center
McClellan AFB, California

design program is accompanied by a series of factors having a great impact upon the in-service design staff. Until four years ago, the A-E program was generally parcelled out to individual engineers and architects to handle after selection of the A-E was made. As the A-E program grew, logistics and control rapidly deteriorated. The time required to place a contract for each project grew, and, in effect, a ceiling on the number of project designs occurred. A long, hard look was given to the A-E program and a different system devised.

Since the major portion of the program was known, projects were "grouped" by professional discipline. Instead of going through the entire A-E selection process for each project, each project group was placed through one selection process and one contract negotiation. In this manner, an A-E obtained a large number of projects, could plan his workload at once and the Air Force benefited by reducing the contract placement time. Reduced A-E costs resulted from similar projects requiring similar specifications and similar drawings.

Effective control of the entire process was effected by placing administrative responsibility for the program with one senior architect. The architect is chairman of the preselection board and utilizes a standard statement of work (SOW) format. With the assistance of the design section professionals, the architect develops a SOW and synopsis for each contract and adminstratively handles the A-E program from start to finish. Correspondence formats have been standardized. Simplification and control have been the keynotes of the A-E program. The architect is the single point of contact through which all A-E work is funneled. Procurement and the judge advocate's offices review all aspects of the A-E contracts, including the selection and negotiation processes, to insure conformance with the law and regulations.

With the advent of the "open-end" or delivery order/on-call A-E contract in FY-80, another effective tool was provided the base design organization. Care is required in using this tool as we went overboard and used only open-end. We learned that what was gained in the selection process time reduction was lost in the placing of the delivery orders. Placement of delivery orders requires 30 to 45 days. In FY-81, "project group" contracts are again being used along with two "generalist" A-E open-end contracts to handle those late starter projects occurring throughout the year. In this way we anticipate that maximum savings in manhours and A-E design costs will result and more projects will be designed. However, the sheer size of the FY-81 A-E design program dictates that another architect or engineer be assigned to assist the A-E single point of contact and avoid any bottlenecks.

Another method used to stretch the professional across a growing workload is by authorizing design and specification technicians. A careful analysis of the professional workload was made and additional personnel were needed. However, while analyzing the requirements, it was found that much of the additional work involved careful preparation of specifications and drawings. Thus, in lieu of hiring all professional personnel, engineering technicians with design experience were obtained and a general engineer hired for the specifications expertise. The technicians do the routine subprofessional work and drafting; the general engineer develops standard specifications, interfaces with procurement and legal offices to resolve problems, and provides review for all reports and project books.

No one individual, organization or concept has been responsible for the turnaround of our engineering design efforts. The measures have required the leadership, support and cooperation of the command engineering staff, base civil engineering management and the many personnel of other base agencies. All have helped the design engineering section to "do more with less" and produce a quality, professional product at the same time. The section is proud of its achievements and expects to continue growth in professional productivity in the future by vigorous pursuit of further engineering design process improvements. That is our blueprint for design. E&S

Ronald Parsons *is chief of the engineering and environmental branch, 2852 Civil Engineering Squadron, McClellan AFB, California. He received his bachelor of science degree in civil engineering from Texas Technological University. He is an engineer-in-training in California and is studying for a degree in law.*

The oil-saturated aquifer at Loring AFB had flooded the POL pumphouse and was threatening nearby wells. That's when they started

Drilling for Oil

One April morning at Loring AFB, Maine, petroleum, oil and lubricants personnel discovered several inches of fuel on the floor of the main pump house in the bulk fuel storage area. This explosive situation forced the immediate shutdown of the pump house and the beginning of a long clean up process. The source of the fuel was not within the building, but underneath it! The soil and groundwater under and around the bulk storage area had been contaminated by insidious, slow leaking over an extended period of time. The problem went completely undetected until the fuel finally appeared in the pump house.

The fuel entered the building through its floor drains. Part of the drain pipe under the building's floor had collapsed. The fuel, floating on top of the groundwater, was pushed up into the building as the groundwater level rose due to melting show.

The base was now faced with two problems. The first involved keeping the fuel out of the pump house so that it could be operated, and the second was to determine the extent of the groundwater contamination and find a way to begin the cleanup. Neither task was easy. The explosive nature of the fuel-saturated soil prohibited jackhammering the concrete floor in the pump house to repair the collapsed pipes.

The ground around the pump house was comprised of oil saturated soil down to the water table with a layer of fuel floating atop the water. Since quick action was needed, an "oil well" was constructed next to the pump house. This "oil well" (fuel recovery system) relied on a water pump to create a local depression in the water table. This caused water, and the fuel on top of it, to flow toward the recovery well. As clean water was pumped from the bottom of the well, fuel was recovered at the water surface. Thus, operation of the pump house was made possible by keeping the water table depressed below the elevation of the building's floor.

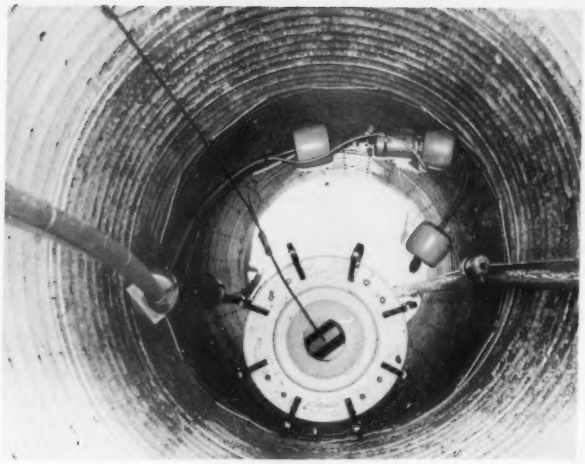
The fuel recovery system shown in Figure 1 is completely automatic and requires no supervision. The well consists of a 36-inch perforated pipe sunk 20 feet vertically into the ground. Fuel recovery is performed by a scavenger. This piece of equipment, which is manufactured by Oil Recovery Systems, Inc., is able to recover fuel 99.9% free of water. Recovery takes place through a coated screen mesh. The screen allows fuel to pass through while holding water back. Thus, water-free fuel is recovered and pumped into a suitable tank. The screen is located down in the well at the water-fuel interface. The scavenger box in Figure 1 contains the pump used to remove the separated fuel from the well. The screen separates fuel continuously but the removal pump runs only when the collection reservoir fills to a predetermined level. To prevent recovered fuel from being lost again a level control switch (part of the scavenger) is placed into the tank being used to collect the recovered fuel.

Automatic operation of the water pump is provided by a conductivity probe which is attached to the bottom of the pump's suction line (see Figure 2). As long as the probe is submerged in clean water, the pump will run and clean water will be discharged to a nearby storm sewer. If either air or fuel is sensed, the pump is shut down. This prevents fuel from being pumped into the storm sewer and also protects the pump from running when there is no water in the well.

The first summer of operation over 7,000 gallons of fuel were recovered. It was subsequently burned in the base central heat plant; but this is only the beginning of the story, as complete cleanup will take years. An architectural-engineering (A-E) firm has been brought in to map the groundwater aquifer in the area and determine its flow pattern. This will permit the proper citing of additional recovery wells to continue the cleanup. The A-E will also help to determine the location of the fuel leak.

How could such a large quantity of fuel escape unnoticed? As many of us have learned in our energy conservation efforts, small hot water leaks add up to big losses over time. A leak of only one drop per second is a loss of more than one gallon per day. The fuel system at Loring AFB is 30 years old. If only one leak at one drop per second existed over this lifetime, well over 10,000 gallons would have been lost. While we have cathodic protection systems on our fuel systems, this does not provide complete protection. Geologists at the American Petroleum Institute (API) estimate that at least 10 percent of all large fuel storage facilities suffer from this problem. Most don't discover it until it is too late. Loring was lucky. The problem was discovered before any wells, either on or off base, were contaminated. The Environmental Protection Agency considers groundwater protection a critical issue.

Oil is commonly considered not to mix with water, but to float on its surface. This is true in the broad sense. Most oils, however, contain components that are soluble in water to the point that they become offensive and make the water unfit for domestic use. Once contaminated, an aquifer may take years or even centuries to become potable again. Cleanup is complicated by oil's properties. Most of the oil that reaches a water table will be suspended or will float at or near the surface. It will tend to



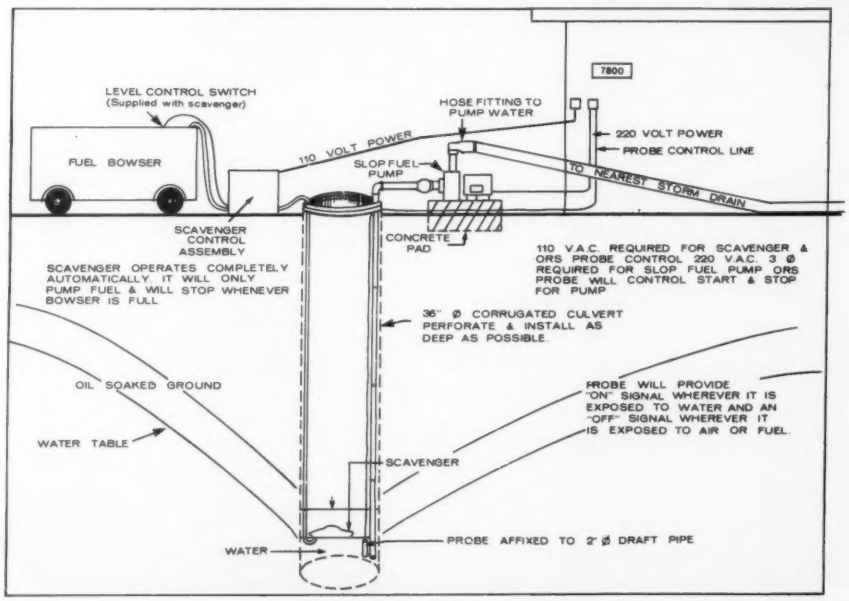
move with the water but will be continually absorbed by the soil particles it contacts. Thus, removing the "free" oil from the water surface will not clean the aquifer, as oil will remain attached to particles of soil. As the level of the water table changes, oil is either left behind or resuspended. Only over many fluctuations of the groundwater level can the aquifer be finally cleansed.

LEFT Down in the 36-inch culvert, the scavenger system is retrieving fuel which is migrating into the well atop the now-sloped groundwater table.

in Groundwater

by Capt Roy K. Salomon, PE

RIGHT At center is the 36-inch perforated culvert from which water is excavated continuously by an explosion-proof pump at right. The fuel-recovering scavenger is at left.



LEFT Figure 2.

There are several signs which may indicate that fuel is being lost to the ground. Spilled oil commonly migrates along artificial fills, such as pipeline trenches and building foundations. Spilled oil also frequently infiltrates sewer systems where the joints between the pipe sections are loose. The smell of the fuel in any of these places should be cause for alarm. Naturally, any fuel detected in wells should be investigated. It takes only a trace of fuel in drinking water to be detectable by the consumer. While these suggestions may help to locate undetected losses, care must be exercised in the cleanup of above ground spills. Fuel spills not only must be kept out of surface waters, but out of the ground as well. And, of course, fuel is but one of a myriad of potential contaminants.

So far, oil spills into the soil and groundwater have not received as much attention as spills that get into our lakes and streams. When oil is spilled into surface water the problem is easily seen and appropriate cleanup action can be taken. Fuel spilled into the ground, on the other hand, is often difficult to detect, harder to clean up, and potentially presents much longer-lasting adverse effects. If the API is anywhere near right in their estimate of the magnitude of this problem, we have only seen the tip of the iceberg. We can expect to see a growing interest in this area of the environment. As this situation has shown us, out of sight is no longer out of mind.

Captain Salomon *is a civil engineer in the requirements division, directorate of programs, Headquarters Air Force Logistics Command, Wright-Patterson AFB, Ohio. He received his bachelor of science degree in civil engineering from Purdue University and his master of science degree in facilities management from the Air Force Institute of Technology. A registered professional engineer in Maine, he is an associate member of the American Society of Civil Engineers.*

0-6, 0-7 PROMOTIONS

Promotion statistics for engineering and services personnel continue on an outstanding path. The statistics are a direct reflection of the tough jobs being done and a recognition of superior efforts.

Keep up the good work.

Brig Gen Charles W. Lamb has been named as a permanent brigadier general.

Col Melvin Gary Alkire has been selected for promotion to temporary brigadier general.

Temporary colonel selectees:
Robert L. Allen
Andrew S. Bobek
*John J. Coughlin
Kenneth W. Cowan
Robert G. Gilbert
Mario B. Ginnetti
**Dewey L. Heglar, Jr.
Bradley H. Hooper
*Marlin J. Humerickhouse
***Bruce W. Johnson
Edward A. Koechle
Thomas E. Lollis
Philip L. Madden
William G. Niemantsverdriet
Danny Rivera
George A. Romero
Allen J. Sailer
Jerry A. Smith
Willett R. Stallworth
Walter T. Whitman III
Duane J. Wray
***Jerry C. Pullium (Secondary Zone)

*Bioenvironmental Engineer
**Prior Services Officer

***Senior Service School Nominee

Mission accomplishment at the expense of the environment is unacceptable. At McClellan this basic tenet has resulted in

winning the DOD Quality Environment Award

by Lt Michael D. Carroll and Paul G. Brunner, PE

Today's society demands environmental awareness and responsibility of its institutions. Mission accomplishment without consideration of the environment is no longer acceptable. An institution's goals must include minimization of environmental impacts as well as the traditional production oriented objectives. Federal installations are especially scrutinized both because of their visibility and because of the expectation of a high degree of social obligation on their part. Consequently, the Department of Defense (DOD) has sought to highlight its emphasis in this area by annually selecting the one DOD installation that best illustrates these concerns. McClellan AFB was selected for the 1979 Secretary of Defense Environmental Quality Award.

McClellan AFB, California is the home of the Sacramento Air Logistics Center (ALC) and employs over 16,000 people. It is subject to some of the strictest environmental laws, rules and regulations in the nation. Adapting the many industrial functions on the base to conform to and exceed required pollution controls, mandated an extensive and comprehensive program encompassing the entire spectrum of environmental concerns.

One significant action undertaken by the base was a project in 1979 to demonstrate incineration capability for the destruction of liquid polychlorinated biphenyls (PCB). Presently, the only method acceptable to the Environmental Protection Agency (EPA) (for PCB above 500 parts per million) is high temperature incineration; however, no incinerators have been approved for that purpose. With over 750 million pounds of PCB in the US and nearly 70 million pounds in DOD inventories, the need to dispose of this suspected carcinogenic dielectric fluid is paramount to both the Air Force and the nation. Recognizing this requirement, personnel initiated a program to develop alternatives. After several years of research and petitioning, the base received EPA approval to perform demonstration PCB incinerations.

Preparations for this demonstration involve basewide coordination and substantial financial resources. Project success could open up liquid PCB disposal possibilities at reasonable cost, and with nationwide ramifications.

The success of McClellan's overall environmental

Environmental planning office personnel discussing a group project. They are from left to right standing, Dale Schulze, Bridgie Rundle, Sandy Arellano, Louie Oliveira, seated, 2Lt Michael Carroll and Paul Brunner.

program was dependent on two aspects: community relationships and total base involvement. McClellan believes community involvement is a main ingredient to overall success. Base personnel were recognized for their above average working relationships with local community groups, environmental planning and enforcement agencies, local governmental bodies, and intra-Air Force environmental organizations. These relationships developed to the extent that base personnel are used as consultants for environmental problems. An example is the base's 20-40 year long range land use plan which was widely publicized and used by county and city departments, various chambers of commerce and citizens groups. The long range planning effort resulted in an Air Force first: the creation of a special program by the city and county of Sacramento to insure the land surrounding McClellan AFB is developed compatible with base plans. This program was incorporated into the charter of the Sacramento Housing and Redevelopment Agency, a body formed under state law.

After the development of a base environmental protection committee consisting of representatives from each base organization, it was apparent that a total base involved program was necessary for a successful environmental program. One way the committee pursued this goal was by establishing a comprehensive base environmental education program which reaches out, stimulates and involves the entire base community. The outstanding feature of this program was a two-hour environmental protection course that was given to approximately 30 supervisors every two weeks.

Because undeveloped land is non-existent on base, there are no significant quantities of wildlife. Nonetheless, base personnel resolved a wildlife problem that affected the base's mission capability. In 1977, thousands of swallows encroached upon the aircraft run-up facilities. In 1979, a solution was found which involved creation of a more desirable habitat away from aircraft and the installation of improvised scarecrows at the run-up facilities.

Although the base has limited natural resources, California abounds with them and is intent on protecting them. As a result, California developed comprehensive environmental programs and perhaps the strictest air pollution laws in the nation. Because of the base's industrial nature, it has a variety of air pollution sources,

The effluent from McClellan's 1.2 million gallon-per-day capacity industrial waste water treatment plant (above) and 2 million gallon-per-day capacity sewage treatment plant (left) will be captured, treated, and reclaimed.

all of which are in compliance or have a variance to operate. The base's efforts in air pollution control have been copied by Air Force and other DOD facilities. Noteworthy accomplishments in the program were resolution of the jet engine test cell and photochemical solvent problems; development of a detailed air pollution episode plan; upgrading base JP-4 storage facilities; and implementation of a van pool program.

The jet engine test cell violation was the most significant air pollution problem for McClellan AFB and possibly the DOD in 1979. Violations were issued by California for excessive dark smoke emissions from the

facilities. All preferred methods to control these emissions were expensive. After one year of exhaustive negotiations and research, base personnel developed and installed an inexpensive air pollution control device called a water-injection/scrubber which was accepted by the state as being in compliance. This method of control became a prototype for other DOD installations.

The Sacramento area has a smog problem which is partially caused by the evaporation and subsequent photochemical reaction of certain solvents. McClellan AFB uses a wide variety of solvents in cleaning and painting operations. After investing great amounts of time and energy to inventory and check several hundred products, the base eliminated or curtailed the polluting materials. In some instances, depot operations were altered and Air Force technical orders revised. The Air Force is now implementing similar changes and procedures at other bases.

Since the base generates large quantities and a variety of hazardous waste, it has developed extensive control measures. A prime example is the comprehensive spill prevention control and countermeasures plan that encompasses all chemical and oil storage on base. The effectiveness of this program has been proven since no spill left the confines of the base for the past several years. The plan identifies over 100 potential spill sites and requires each area to identify the pollution hazard, what to do in case of a spill, and whom to contact. Each site is identified by a pollution hazard sign and each area is inspected annually in lieu of the less stringent EPA triennial inspection standard.

McClellan AFB was the first Air Force base to organize a comprehensive program to inventory, control and properly dispose of PCB. In early 1976, personnel began an extensive inventory and marking program of base-managed depot stocked equipment to determine which equipment contained this material. This inventory was massive because of the many electrical items managed by the base. This type of review process is now an Air Force-wide project.

A key to McClellan's solid waste program is its access to Sacramento County's north area refuse station, where the base disposes most of its solid waste. This transfer station was made possible when the base agreed to grant Sacramento County a 10-year lease on 14 acres of base property. This effort has benefited the base and local residents by reducing trips to the distant county landfill.

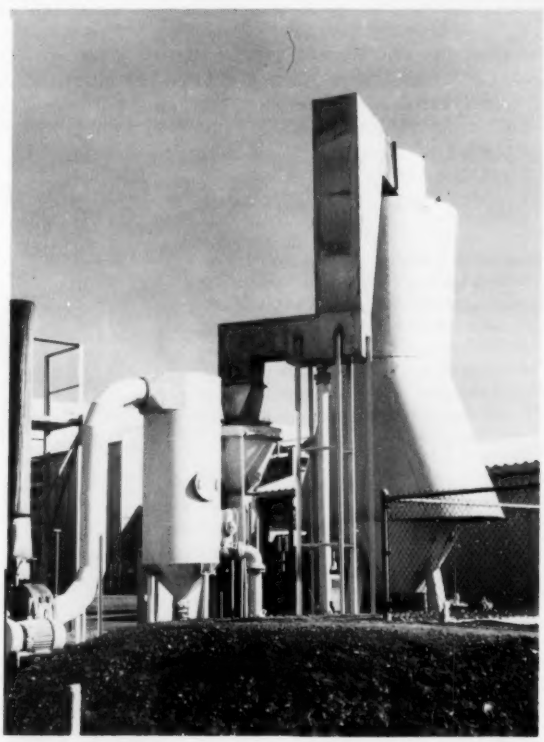
McClellan AFB expanded its resource recovery program in 1979 to include scrap white ledger paper, and waste PD 680 Type 2 cleaning solvent. Prior to its expansion, the program already included computer paper, computer tab cards and waste oils. The base encouraged volunteer organizations to help the base recycle its solid waste.

One particular product, emulsified oils, presented a reclamation problem. A good method was not available to separate and reclaim this product; therefore, the oil had to be disposed of as a hazardous waste. Base personnel approached this problem imaginatively, and converted an old sewage tank to separate and reclaim this valuable material.

Carrying reclamation one more step, the base will soon start operation of a three-million dollar waste water reclamation project, further enhancing the water quality of the community and helping to curtail the depletion of the area groundwater. This project, one of the first major endeavors in California, will reuse 1.2 million gallons of reclaimed water per day for such purposes as industrial processes and the irrigation of uninhabited planted areas.

To maintain the high quality of drinking water in the Sacramento community, the base created an environmental committee to specifically monitor and maintain water quality surrounding the base. During 1979, isolated areas of the Sacramento community were experiencing groundwater contamination due to the intrusion of cleaning solvents, such as trichloroethylene. Self-initiated early planning and contracting actions allowed the base to fully participate with state and local regulatory agencies to help resolve the community problem. Actions to date include construction of four strategically located base water monitoring wells, a soil sampling and analysis program, and an accelerated groundwater monitoring program.

In a further effort to identify possible sources of contamination, the committee established the location and contents of past base landfills and underground storage



Pictured above is McClellan's liquid waste incinerator which may be the key to the disposal of polychlorinated biphenyls (PCB).

tanks. Because of the completeness of these data, the base initiated a test aerial infrared photography program. This program checks the accuracy and feasibility of the infrared technique to locate buried landfills and storage tanks, by cross-checking results against McClellan preidentified sites. If successful, the program could be used at other bases. Preliminary results are promising.

McClellan AFB was chosen to develop other new programs. The energy technology demonstration center (see May 1980 **Quarterly**) and the testing of the new Air Force environmental impact analysis guidelines were derived from the National Environmental Policy Act (NEPA).

The environmental impact analysis project came about when the Council of Environmental Quality recently revised its guidelines. The Air Force was the first branch of the military to develop and enact the new changes. Prior to implementing the new requirements, Air Force chose McClellan AFB as a test base for the new guidelines. The base's input on this test program markedly shaped the final Air Force procedures. The critical ingredient was the extensive basewide education effort and proponent participation. The new guidelines greatly reduced the environmental planning office paperwork workload.

In short, the operation of a diverse industrial Air Force base presents many environmental challenges that must be resolved. McClellan AFB personnel are meeting these challenges by developing a total base involved program that not only reacts to environmental problems but continually strives to anticipate and proceed far beyond normal requirements to produce a better environment for the base, the Sacramento community, and possibly the nation.

Col Robert L. Carey, former base civil engineer and chairman of the environmental protection committee working group, with Paul Brunner, base senior environmental engineer discuss PCB incinerator (background) operations.

This oil separator was the key to the emulsified oil reclamation problem.

Lieutenant Carroll *is an environmental engineer assigned to the 2852d Civil Engineering Squadron, McClellan AFB, California. He was commissioned in 1979 after eight years enlisted duty through the airmen's education and commissioning program. He earned his master of science degree in civil engineering and master of business administration degrees from Rensselaer Polytechnic Institute.*

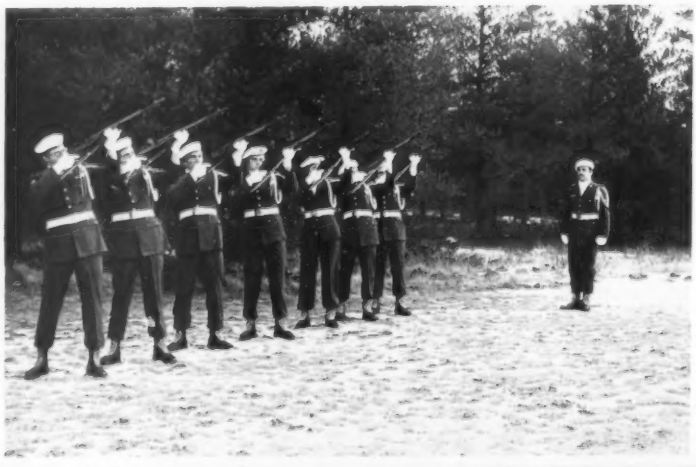
Paul Brunner *is senior environmental engineer at Sacramento Air Logistics Center, McClellan AFB, CA. He earned his bachelor of science degree in civil engineering from San Diego State University and is registered as a professional engineer in the State of California. He has extensive consulting and government environmental/engineering experience.*

MILITARY HONORS

by TSgt Eric A. Pedersen

It is the policy of Congress and the Department of Defense that military honors be provided for all deceased active duty personnel and, to the maximum extent possible, retired personnel and veterans who served honorably in our nation's armed forces. How military honors are performed varies between the Services and tradition plays an important part of the ceremony. The "riderless horse," "burial at sea" and the "missing man formation" are some of the unique traditions each of the Services has maintained, but each conveys the final tribute to a fallen comrade; a tradition carried on since mankind has maintained armies.

Although the Air Force is the youngest branch of the Services they have carried on the tradition of providing military honors. During the initial stages of establishing the Air Force's military honors program many problems were encountered. Base services, which was then a section under the supply squadron, had the responsibility of scheduling military honors, while the security



police would normally perform them. The communication, then and later, when services became a separate division under the base commander, was not always effective. The security police had their problems. With their reduced manning they could not support all the requirements. Training of team members was reduced and there was a lack of discipline within the program. The number of congressional inquiries and inspector general complaints soon rose to a level where a realignment of responsibilities was required. The realignment resulted in services assuming all responsibilities for the military honors program within an assigned geographical area.

How does one build an effective military honors program? First and most importantly, the wing and base commanders must realize the military honors program is in reality not totally a services program, but a commander's program as well. The honors team members represent the Air Force and the installation from which the group originates. The manner in which they conduct themselves during their performance leaves a lasting impression on the next of kin and others who are in attendance. Once command support is obtained the first major hurdle has been passed.

The next area of consideration is selection of the honor guard. Should it be a person on detail from each squadron or consist of volunteers? There may be mixed emotions at this point and each view is dependent on the command emphasis that is provided in support of the military honors program. One very important factor that must be considered when members are detailed to this organization, is their attitude. Often, people who are detailed have a lethargic or lackadaisical attitude

toward the task to be completed. One only needs to look at the dormitory charge of quarters and bay orderly details. A less than satisfactory attitude is readily observed, especially when personnel are required to perform these duties on weekends and holidays. Considering that military honors many times are performed on weekends and holidays, and involve travel before and after normal duty time, it is imperative that the selection process be prudent. One proven method of selection has been the personal interview with each candidate for the honor guard. Airmen of today are better educated, but may not have total job satisfaction and seek means to learn more about the Air Force and its traditions. The honor guard is one medium by which they obtain satisfaction, recognition, and rededication to the Air Force.

The size of the honor guard and the required training are very important factors in a good program. Normally a minimum of 21 people are required to provide complete graveside honors, but periodically there may exist the requirement for two interments at the same time at different geographical locations; therefore, a minimum of two fully-trained teams may be necessary at some bases. For those installations located in an area with a high concentration of retired personnel there may be an additional requirement. For a normal wing, a cadre of 50 to 55 trained personnel should suffice. This total will take care of transfers, separations and leaves, and will allow time for recruitment and training. Training is a continuing program. Some team chiefs may feel practicing the moves once or twice before a scheduled interment may be sufficient. This may suffice for honor guard teams who are required to perform 8 to 10 funerals a month and the same 21 members are always in attendance. But when the group has not practiced as a unit, it could result in problems. It must be remembered the honor guard is "center stage," everyone is looking at each move and one person being out of sequence could result in criticism. The entire team should meet monthly and discuss policies, make announcements and schedules and hold training. This will maintain group interest in the program and keep their capability at a high level. This does not mean a practice session should not be held the day prior to the interment, as this training helps to "pump the adrenaline" and make the team ready. Actual training should be as realistic as possible. A locally manufactured box similar in size and weight to an actual casket (some bases use real caskets), color guard flags, weapons, and a flag draping the casket should be used for each practice session. This allows team members to get the feel of the event, and they will not be surprised at the weight of the casket during an actual interment. Weather permitting, training sessions should be held outdoors. This gives the group the opportunity to perform in a realistic environment. There have been numerous instances when because of windy, cold conditions the flag draping the coffin could not be folded correctly or the color guard lost control of the flag. The more a unit practices in realistic weather conditions, the better their actual performance should be.

Another major factor causing a good honor guard program is recognition. Since on numerous occasions members may be required to perform on weekends and holidays, and much off-duty time will be spent traveling to or from a funeral, recognition becomes paramount. Plaques commemorating 100, 150 or 200 hours of honor guard duty are one form of recognition that has been very successful. The plaques can be purchased from operations and maintenance funds, and an AF form 9 will obtain the engraving. If the plaque is used, don't just hand it to the person. Have a letter, forwarded through the individual's commander, state why the award is being presented. Many times personnel see the presentation and want to become honor team members. Nearly every installation has a "three day pass" program as a form of reward. Sometimes the pass is signed by the wing or base commander and is an excellent form of recognition. A certificate of recognition can be awarded at any time and basically tells the individual "Thank you." When any form of recognition is used it should go through the individual's commander. When favorable communications are used in recognition programs and performance reports, it may assist the individual immensely at promotion time.

Although military honors are normally associated with funerals, the program can be expanded to include color guards for parades, retreat ceremonies, posting of colors at banquets, open houses, etc. The more the color guard is visible the better the program becomes. Although the military honors program may be the commander's, it is the responsibility of services to have it organized, trained and ready to go. This program cannot be hit or miss — constant attention must be provided. E&S

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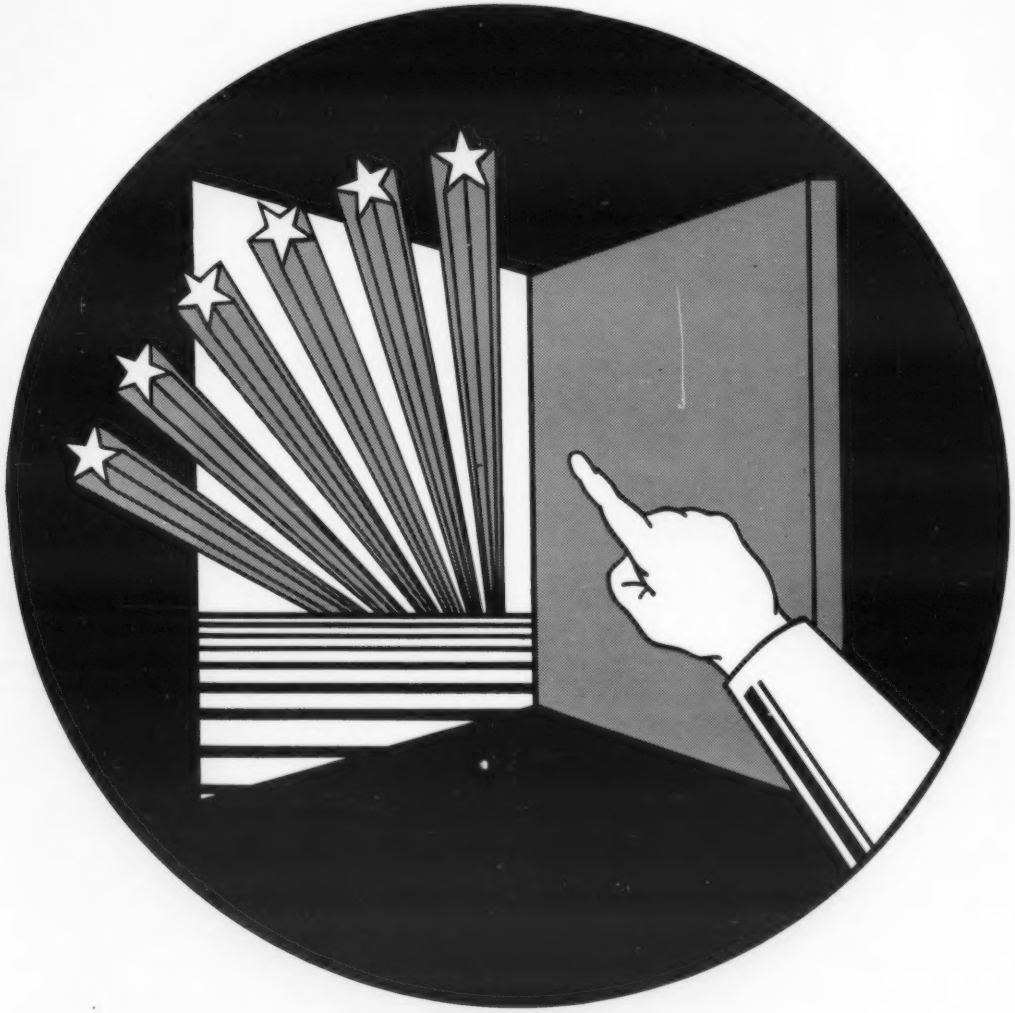

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